SHAPING PREFERENCES WITH PIGOUVIAN TAXES

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A Pigouvian tax is a tax that is imposed to correct an externality, which arises when a person engages in behavior that harms others. Pigouvian taxes are popular among academics—with prominent legal scholars and economists arguing for their imposition on myriad harmful goods and activities, like carbon emissions and alcohol. Policymakers have been receptive to at least some of these arguments as evidenced by taxes recently imposed on or proposed for a variety of externality-generating goods, including guns, plastic bags, and sugary drinks.

The conventional economic rationale for Pigouvian taxes assumes that they affect behavior by increasing the prices of taxed goods and not by altering people's underlying preferences for them. For example, a carbon tax reduces driving by making gasoline more expensive, but it otherwise leaves people's desire to drive unchanged. In other words, people would resume their previous level of driving if the carbon tax went away. This conclusion follows from the standard assumption in economics that people's tastes and preferences are fixed and determined exogenously to public policy.

Challenging that standard analysis, I argue that Pigouvian taxes can in fact shape preferences and that policymakers should consider using them for that purpose. For instance, a carbon tax might cause more people to take the train or ride a bike and, through repeated or habitual behavior over time, to develop a taste for these alternative modes of transportation—a taste that would make driving less attractive, separate from the increase in gas prices.

This Article is the first to examine in detail the psychological mechanisms through which Pigouvian taxes can alter preferences. I argue that, because preferences are malleable, the harm to individual consumers resulting from Pigouvian taxes will often be smaller than economists claim. Moreover, I show that malleable preferences dramatically expand the scope for and potential benefits of Pigouvian taxes. For example, they create the possibility that socially beneficial behaviors encouraged by the taxes—such as the installation of solar panels by homeowners—will become contagious and spread through the population. This social multiplier effect results from changes in social norms or from psychological processes like the mere exposure effect. I conclude that preference shaping can cause Pigouvian taxes to be much more effective in achieving public policy goals than legal scholars and economists have traditionally assumed—a point that I illustrate in a variety of contexts, including environmental law, gun policy, and public health policy.

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INTRODUCTION

An externality arises when a person engages in behavior that harms others.[1] For example, driving contributes to global warming, and smoking indoors harms those exposed to second-hand smoke. Economists and economically-oriented legal scholars acknowledge that activities like these that impose external costs represent a market failure.[2] People engaging in the behavior do not bear its full cost, so they tend to engage in more of it than is optimal from the perspective of society as a whole.

Economists also generally agree on how the government should intervene. Because people respond to price increases, the government should use taxes to force them to internalize the external costs of their behavior. These externality-correcting taxes are called "Pigouvian" taxes in honor of Arthur Pigou, an economist who championed them.[3]

While the idea of taxing externalities is not new, the effort to replace other forms of regulation with Pigouvian taxes has picked up steam in recent years. Prominent legal scholars and economists now argue for Pigouvian taxes on guns,[4] fake news,[5] carbon emissions,[6] the collection and use of data,[7] borrowing,[8] complex consumer contracts,[9]

1. Technically, externalities can be positive or negative. Behavior that benefits third parties involves a positive externality. My focus is on negative externalities, which result from behavior that causes harm to third parties. For brevity, I will use the term "externality" instead of "negative externality."

2. ROBERT COOTER & THOMAS ULEN, LAW & ECONOMICS 38–40 (6th ed. 2011).

3. ARTHUR C. PIGOU, THE ECONOMICS OF WELFARE 183–203 (4th ed. 1932).

4. Thomas Griffith & Nancy Staudt, *Taxing Guns*, 95 S. CAL. L. REV. 73, 95–104 (2021); Samuel D. Brunson, *Paying for Gun Violence*, 104 MINN. L. REV. 605, 606–07 (2019) (proposing a gun tax that would "compensate society for the negative externalities caused by gun violence"); Philip J. Cook et al., *Gun Control After Heller: Threats and Sideshows from a Social Welfare Perspective*, 56 UCLA L. REV. 1041, 1085 (2009). *But see* Victor Fleischer, *Curb Your Enthusiasm for Pigovian Taxes*, 68 VAND. L. REV. 1673, 1675–78 (2015) (arguing against a Pigouvian tax on guns).

5. Peter N. Salib, *The Pigouvian Constitution*, 88 U. CHI. L. REV. 1081, 1122–26 (2021).

6. *E.g.*, SHI-LING HSU, THE CASE FOR A CARBON TAX: GETTING PAST OUR HANG-UPS TO EFFECTIVE CLIMATE POLICY 25–115 (2011).

7. Omri Marian, *Taxing Data*, 47 BYU L. REV. 511, 565–66 (2022); Omri Ben-Shahar, *Data Pollution*, 11 J. LEGAL ANALYSIS 104, 148–49 (2019).

8. Olivier Jeanne & Anton Korinek, *Managing Credit Booms and Busts: A Pigouvian Taxation Approach*, 107 J. MONETARY ECON. 2, 2 (2019).

9. Michael Simkovic & Meirav Furth-Matzkin, *Proportional Contracts*, 107 IOWA L. REV. 229, 234–35 (2021).

digital advertising,[10] alcohol,[11] cigarettes,[12] and a variety of other goods and activities that cause harm to third parties.[13] Legal scholars have even argued that administrative agencies have the authority to and should adopt Pigouvian taxes in regulating a variety of industries.[14] Policymakers have been receptive to at least some of these arguments, as illustrated by taxes proposed for or imposed upon a number of externality-generating goods and activities,[15] including guns,[16] opioids,[17] plastic bags,[18] sugary drinks,[19] exotic dance clubs,[20] and congested roads.[21]

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10. Paul Romer, *Taxing Digital Advertising*, PAUL ROMER (May 17, 2021), https://adtax.paulromer.net/ [https://perma.cc/PPX6-J68R] [hereinafter Romer, *Digital Advertising*]; Paul Romer, Opinion, *A Tax That Could Fix Big Tech*, N.Y. TIMES (May 6, 2019), https://www.nytimes.com/2019/05/06/opinion/tax-facebook-google.html [https://perma.cc/GS2S-MDTH].

11. Ian W.H. Parry, *Should Alcohol Taxes Be Raised?*, 32 REG. 10, 12 (2009).

12. Jonathan Gruber, *Government Policy Towards Smoking: A View from Economics*, 3 YALE J. HEALTH POL'Y, L., & ETHICS 119, 119–20 (2002) [hereinafter Gruber, *Smoking Policy*].

13. *E.g.*, Daniel J. Hemel & Lisa Larrimore Ouellette, *Trademark Law Pluralism*, 88 U. CHI. L. REV. 1025, 1060–62 (2021) (arguing for a Pigouvian tax on certain trademark transactions); Hannah J. Wiseman, *Taxing Local Energy Externalities*, 96 NOTRE DAME L. REV. 563, 570–71 (2020); Aaron M. Levine & Joshua C. Macey, *Dodd-Frank Is a Pigouvian Regulation*, 127 YALE L.J. 1336, 1349–52 (2018) (extolling the virtues of Pigouvian taxes); Jonathan S. Masur & Eric A. Posner, *Toward a Pigouvian State*, 164 U. PA. L. REV. 93, 95 (2015) (arguing for the use of taxes to address a variety of externalities).

14. Masur & Posner, *supra* note 13, at 98–99.

15. For a general overview of the types of goods and activities that states have begun taxing in recent years, see Nadav Shoked, *Cities Taxing New Sins: The Judicial Embrace of Local Excise Taxation*, 79 OHIO ST. L.J. 801, 806–09 (2018).

16. Seattle, Wash., Ordinance 124833 (Aug. 21, 2015) (imposing a tax on gun and ammunition sales); Rachael Bade, *New Gun Control Strategy: Tax 'Em*, POLITICO (Apr. 9, 2013), https://www.politico.com/story/2013/04/guns-bullets-taxes-gun-control-tool-089782 [https://perma.cc/KN3G-2UGD]. In addition to recent proposals for gun taxes, there are many gun taxes that have been in existence for decades and that, at least implicitly, are based on the Pigouvian theory of taxation. *See* Griffith & Staudt, *supra* note 4, at 75–83.

17. For a review of opioid taxes and tax proposals, see Michelle M. Kwon, *Pulling the Wrong Lever Opens a Trap Door: Using Taxes to Fight the Opioid Epidemic*, 93 TEMP. L. REV. 343, 360–65 (2021).

18. *E.g.*, Tatiana Homonoff, *Skipping the Bag: The Intended and Unintended Consequences of Disposable Bag Regulation*, 41 J. POL'Y ANALYSIS & MGMT. 226, 231 (2022) (discussing the Chicago plastic bag tax) [hereinafter Homonoff, *Unintended Consequences*]; Sara Murray & Sudeep Reddy, *Capital Takes Bag Tax in Stride*, WALL ST. J. (Sept. 20, 2010), https://www.wsj.com/articles/SB10001424052748704505804575484162110213150 [https://perma.cc/U5ZB-UNCT] (discussing the plastic bag tax in Washington, D.C.).

19. A number of U.S. cities have adopted taxes on sugary beverages. Hunt Allcott et al., *Should We Tax Sugar-Sweetened Beverages? An Overview of Theory and Evidence*, 33 J. ECON. PERSPECTIVES 202, 202–03 (2019).

20. GA. CODE ANN. § 15-21-209 (2022); TEX. BUS. & COM. CODE § 102.052(a) (West 2009); UTAH CODE ANN. § 59-27-101 (West 2004).

21. Ana Ley, *Why Drivers Could Soon Pay $23 to Reach Manhattan*, N.Y. TIMES (Aug. 18, 2022), https://www.nytimes.com/2022/08/18/nyregion/nyc-congestion-pricing-manhattan.html [https://perma.cc/2WAV-ZC2P]; Aya Selmoune et al., *Influencing*

The accepted rationale for Pigouvian taxes assumes that they affect behavior only by increasing the prices of taxed goods and not by altering people's tastes and preferences. For example, standard analysis assumes that a carbon tax reduces driving by making gasoline more expensive, but it otherwise leaves people's desire to drive unchanged. In other words, people who had reduced miles driven in response to a carbon tax would resume their previous level of driving if the carbon tax went away. Similarly, a cigarette tax may cause smokers to quit, but only because smoking now costs too much and not because smokers no longer desire cigarettes. This view of Pigouvian taxes is consistent with the economic analysis of law in general. Law and economics scholars generally focus on the effects of legal rules on incentives and how they alter behavior by changing the payoffs to various courses of action.[22]

Nonetheless, the notion that Pigouvian taxes do not alter preferences lacks an empirical foundation. Instead, it is simply based on the standard assumption in economics that people's preferences are fixed and determined exogenously to, or separately from, public policy.[23] While this assumption is useful for some purposes, including that it simplifies economic models, it is also false. Psychologists and other social scientists have accumulated significant evidence that preferences can change for a variety of reasons.[24] In fact, government intervention has significantly altered preferences in several important areas, including smoking and seatbelt use. Whereas large numbers of people once smoked or refused to buckle up, today, many view these behaviors as abhorrent—a result that represents a sea change in preferences and behavior and that was produced in large part by changes in the law.[25]

Once we recognize that preferences can be endogenous to public policy, an intriguing possibility arises: policymakers might shape preferences through the law. Several legal scholars have explored this possibility.[26] Yet these scholars have focused their attention on mandates

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Factors in Congestion Pricing Acceptability: A Literature Review, 2020 J. Advanced Transp. 1, 2–4 (2020); Maria Borjesson et al., *The Stockholm Congestion Charges—5 Years on. Effects, Acceptability, and Lessons Learnt*, 20 Transp. Pol'y 1, 1–2 (2012).

22. Oren Bar-Gill & Chaim Fershtman, *Law and Preferences*, 20 J. L., Econ., & Org. 331, 331 (2004).

23. *See infra* Part I.B.

24. *See infra* Parts II and III.

25. *See infra* Parts II and III.

26. *E.g.*, Ariel Porat, *Changing People's Preferences by the State and the Law*, 22 Theoretical Inquiries in L. 215, 226–38 (2021); Bar-Gill & Fershtman, *supra* note 22, at 331–34; Cass R. Sunstein, *Endogenous Preferences, Environmental Law*, 22 J. Legal Stud. 217, 217–21 (1993) [hereinafter Sunstein, *Environmental Law*]; Cass R. Sunstein, *How Law Constructs Preferences*, 86 Geo. L.J. 2637 (1998) [hereinafter Sunstein, *Constructing Preferences*]; Kenneth G. Dau-Schmidt, *Legal Prohibitions as More Than Prices: The Economic Analysis of Preference Shaping Policies in the Law*, *in* Law and Economics: New and Critical Perspectives 153, 153–71

and other forms of regulation, not Pigouvian taxes. Some have even contrasted Pigouvian taxes, which they view as altering behavior by changing prices, with mandates and laws, such as criminal laws, that are intended to mold good citizens by instilling desirable preferences.[27]

In this Article, I argue that Pigouvian taxes can shape preferences and that policymakers should consider using them for that purpose. A carbon tax, for instance, might cause more people to take the train or ride a bike and, through repeated or habitual behavior over time, to develop a taste for these alternative modes of transportation—a taste that would make driving less attractive, separate from the increase in gas prices.

I make an original contribution to the literature on Pigouvian taxes by examining in detail the psychological mechanisms through which these taxes can alter preferences. I argue that, because preferences are malleable, the harm to consumers resulting from Pigouvian taxes will often be smaller than economists claim. Moreover, I show that malleable preferences dramatically expand the scope for and potential benefits of Pigouvian taxes. For example, they create the possibility that socially beneficial behaviors encouraged by the taxes—such as the installation of solar panels by homeowners—will become contagious and spread through the population. This social multiplier effect results from changes in social norms or from psychological processes like the mere exposure effect. I conclude that preference shaping can cause Pigouvian taxes to be much more effective in achieving public policy goals than legal scholars and economists have traditionally assumed—a point that I illustrate in a variety of contexts, including environmental law, gun policy, and public health policy.

Part I provides background by describing the problem of externalities and the conventional rationale for using Pigouvian taxes to address them. I also explain how the assumption of fixed preferences has artificially limited the use of Pigouvian taxes to influence behavior.

Parts II and III provide evidence from the social sciences that preferences are not fixed and explains various ways in which Pigouvian taxes might shape them. Part II argues specifically that, contrary to standard assumptions in economics, preferences are not always firmly

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(Robin P. Malloy & Christopher K. Braun eds., 1995) [hereinafter Dau-Schmidt, *Legal Prohibitions*].

27. *See* Kenneth G. Dau-Schmidt, *Preference Shaping by the Law*, *in* THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW 84, 85 (Peter Newman ed., 1998) (contrasting "opportunity-shaping policies such as taxes" with "preference-shaping policies such as imprisonment") [hereinafter Dau-Schmidt, *Preference Shaping*]; Sunstein, *Environmental Law*, *supra* note 26, at 239–40.

established before people make decisions. Especially in unfamiliar situations, preferences may be constructed at the moment of choice, and preference construction is heavily influenced by salient contextual factors. This means that Pigouvian taxes can affect preferences by providing information, activating certain goals, and increasing the salience of particular social norms. A tax on guns, for example, might signal that the legislature and a majority of the public have concluded that guns create risks sufficient to justify a meaningful effort to reduce the quantity of guns that are in circulation. Especially if accompanied by a public education campaign that highlights the dangers that guns pose, the tax could alter preferences for gun ownership—particularly among those who do not already have a strong attachment to guns. Even if the tax did not affect gun enthusiasts, the combination of the tax and the education campaign could cause those who do not already own a gun to think twice before purchasing one. As a result, many would-be gun owners might develop a preference against firearms.

Part III discusses how, in addition to influencing the preference construction process, Pigouvian taxes can shape preferences indirectly—largely through their effect on people's choices and behavior. It turns out that, contrary to economists' assumptions, preferences do not always determine choices. Instead, causation is often reversed, and the choices that we make determine our future preferences, specifically through psychological processes like the mere exposure effect, dissonance reduction, adaptation, and habit formation. Since taxes alter people's choices by raising the prices of certain goods and activities, they indirectly alter preferences via these various psychological mechanisms. Moreover, these preferences, once established, may be more or less stable and not very susceptible to the influence of contextual factors. For example, a carbon tax that makes driving expensive may cause people to choose alternative forms of transportation, and that choice, when made repeatedly, may eventually lead to a preference to avoid driving. Such a preference could prove long-lasting.[28]

Part IV argues that because preferences are endogenous, Pigouvian taxes are in fact more efficient than standard economic analysis suggests. The existence of endogenous preferences challenges the claim by economists that Pigouvian taxes cause harm to consumers—harm that at least partially offsets the benefits of the taxes for society as a whole. In particular, standard economic analysis concludes that a Pigouvian tax reduces consumer utility because consumers react to it by substituting less desirable untaxed goods for more desirable taxed

28. *See infra* Part III.B.

ones—a phenomenon that economists refer to as the "substitution effect."[29] For example, if a plastic bag tax causes consumers to switch to reusable bags, standard analysis assumes that, despite the environmental benefits, consumers suffer harm because, in the absence of the tax, they prefer plastic bags. In Parts II and III, however, I argue that a plastic bag tax may actually cause consumers to prefer reusable bags because the tax makes salient the environmental damage brought about by plastic bags. The tax effectively replaces a bad habit (the thoughtless use of plastic bags) with a good one (bringing reusable bags to the store). If that is the case, then it is less clear that substituting reusable bags for plastic ones reduces consumer utility. In fact, if the tax causes environmentally conscious consumers to take pride in their use of reusable bags, consumers may be better off than they were before the tax—meaning that the tax not only helps the environment, but it also benefits consumers. If correct, this conclusion turns textbook economic theory on its head.

Part V argues that, in many instances, endogenous preferences broaden the scope for Pigouvian taxes beyond what economists and legal scholars have traditionally assumed. Preferences, including harmful preferences, are often infectious or socially contagious. If you smoke or overeat, you increase the chances that those around you will smoke and overeat. Since your bad habits may cause your family, friends, and neighbors to develop bad habits of their own, any harm that they suffer arguably should be counted as part of the external cost of your own behavior. At present, economists usually ignore these costs when they calculate externalities. If they counted these costs, then the appropriate scope for Pigouvian taxes on harmful goods like cigarettes and sugary drinks would potentially be much larger than is currently assumed.

Part VI argues that while the infectious nature of harmful preferences can exacerbate externalities, the infectious nature of socially beneficial preferences can enhance the effectiveness of Pigouvian taxes. For example, several studies have found that preferences for solar panels are contagious.[30] If a carbon tax increases the price of electricity and causes my neighbor to install solar panels, my neighbor's response increases

29. *See infra* Part IV.A.

30. Andrea Baranzini et al., *What Drives Social Contagion in the Adoption of Solar Photovoltaic Technology?* 4–5 (Centre for Climate Change Econ. & Pol'y Working Paper No. 308, 2017); Marcello Graziano & Kenneth Gillingham, *Spatial Patterns of Solar Photovoltaic System Adoption: The Influence of Neighbors and the Built Environment*, 15 J. Econ. Geography 815, 837 (2015); Bryan Bollinger & Kenneth Gillingham, *Peer Effects in the Diffusion of Solar Photovoltaic Panels*, 31 Mktg. Sci. 900, 910 (2012).

the likelihood that I will install solar panels. This "social multiplier effect" could allow the government to reduce carbon emissions to a given target level using a smaller carbon tax than standard analysis would suggest is needed.[31]

Despite its promise, the use of Pigouvian taxes to shape preferences is not without risks. The risks include those that stem from the undue influence of special interest groups in the legislative process and from other forms of government failure. In Part VII, I address these and other potential objections to my proposal and argue that, while policymakers should exercise caution, preference-shaping Pigouvian taxes should not necessarily be off limits. I also sketch out the beginnings of a framework to help policymakers determine when it is appropriate to use Pigouvian taxes to change preferences.

I. The Conventional Rationale for Pigouvian Taxes

This Part provides background by describing the problem of externalities and the accepted rationale for using Pigouvian taxes to address them. I also explain how the assumption of fixed preferences has artificially limited the use of Pigouvian taxes to influence behavior.

A. Externalities

In modeling human behavior, economists make several assumptions, including that individuals rationally seek to maximize their own utility given their preferences and that firms rationally seek to maximize profits.[32] Based on these assumptions, economists conclude that market interactions can produce an outcome that is economically efficient in the sense that it would be impossible for the government to intervene in a way that would make everyone better off than they would be absent the intervention.[33]

To illustrate, consider the gasoline market. Utility-maximizing consumers buy gas up the point at which its price equals the anticipated benefit from using it for driving. Profit-maximizing firms produce gas up to the point at which its price equals the cost of producing it. As a result, the market-clearing price equals the cost of the last gallon of gas produced and represents the dollar value of the utility that the consumer who buys that gallon of gas expects to derive from it.[34] The government

31. *See infra* Part VI.

32. For a discussion and critique of these assumptions, see Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 Cal. L. Rev. 1051, 1060–70 (2000).

33. N. Gregory Mankiw, Principles of Microeconomics 147–49 (6th ed. 2012).

34. *See id.*

cannot improve on this market outcome by mandating an increase in gas production since the cost to firms of producing additional gallons would exceed the benefit to consumers.[35] Conversely, the government would decrease social welfare by mandating a reduction in production because some gallons of gas would not be produced even though the benefit to consumers would exceed the cost to firms.[36]

This textbook result does not hold, however, in the presence of certain well-known market failures—one of which is the existence of an externality.[37] An externality arises when a person engages in behavior that harms others.[38] Returning to the gas example, people who drive contribute to global warming, thereby imposing a cost on the rest of society. Since it does not include the external cost of global warming, the market price of gas does not reflect its full social cost.[39] Economists assume that people selfishly ignore any external costs of their behavior, which means that some gas will be produced and consumed even though its benefits are less than its social cost, a condition that is economically inefficient.[40]

The standard remedy for externalities is to impose a Pigouvian tax.[41] The government could, for example, impose a tax on gas to increase its price to reflect its full social cost, including the external cost attributable to global warming. The optimal Pigouvian tax would be the external cost generated by the last gallon of gas consumed at the optimal quantity—an amount that economists have estimated by forecasting the likely damage caused by global warming.[42] The optimal tax would force consumers to internalize the global warming externality and reduce the use of gas to the economically efficient level.

In addition, while the government could address the external cost of driving in various ways—for example, by mandating how many gallons of gas people can use each week—economists generally argue that Pigouvian taxes possess multiple advantages over other forms of regulation. For instance, all that the government needs to know to efficiently implement a Pigouvian tax on gas is the expected marginal

35. *See id.*
36. *See id.*
37. Jonathan Gruber, Public Finance and Public Policy 120–33 (2d ed. 2007).
38. *Id.* at 121.
39. *See* Mankiw, *supra* note 33, at 197–99.
40. *See id.*
41. *Id.* at 202–04.
42. *See id.* at 198–203; *see also* Interagency Working Grp. on Soc. Cost of Greenhouse Gases, U.S. Gov't, Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, at 4 (2016) (summarizing the social cost of carbon dioxide for the years 2010 through 2050).

harm from consuming it.[43] The government does not need to know the burden on each consumer of reducing gas consumption. Moreover, a Pigouvian gas tax allows for the possibility that gas consumption might vary among consumers because some might find driving more valuable—and therefore be more willing to pay the tax—while others might find it worthwhile to reduce the amount that they drive so as to avoid the tax.[44] Finally, gas taxes generate revenue that the government can use to cut other taxes or to provide public goods, and they encourage firms and consumers to find cheap ways to reduce gas consumption, such as eliminating unnecessary trips and producing and driving more fuel-efficient cars.[45]

B. Assumption of Fixed Preferences

In addition to assuming that people are rational utility maximizers, economists make a variety of assumptions about people's preferences. Specifically, they assume that preferences are well-defined and complete, in the sense that people have preferences over and can rank order all possible options that they face,[46] that preferences are stable and do not change over time,[47] that preferences are determined exogenously

43. Louis Kaplow & Steven Shavell, *On the Superiority of Corrective Taxes to Quantity Regulation*, 4 Am. L. & Econ. Rev. 1, 3–12 (2002).

44. *See* Gloria E. Helfand et al., *The Theory of Pollution Policy*, *in* 1 Handbook of Environmental Economics 249, 275–76 (Karl-Göran Mäler & Jeffrey R. Vincent eds., 2003) (contrasting mandates with taxes for this reason).

45. Louis Kaplow, *Optimal Control of Externalities in the Presence of Income Taxation*, 53 Int'l Econ. Rev. 487, 488 (2012) (discussing the use of Pigouvian tax revenue to make distribution-neutral adjustments to the income tax); *see* Cameron Hepburn, *Regulation by Prices, Quantities, or Both: A Review of Instrument Choice*, 22 Oxford Rev. Econ. Pol'y 226, 228–29 (2006); Helfand et al., *supra* note 44, at 286–87.

46. Korobkin & Ulen, *supra* note 32, at 1064 (noting that a standard assumption in economics is that "actors should be able to compare the utility consequences of all alternatives to each other"). For a critique of this assumption, see John W. Payne et al., *Measuring Constructed Preferences: Towards a Building Code*, 19 J. Risk & Uncertainty 243, 245 (1999).

47. William J. Congdon et al., Policy and Choice: Public Finance Through the Lens of Behavioral Economics 18 (2011) ("In the standard economic analysis . . . individuals optimize perfectly [and] hold preferences that are complete, stable, and well specified."); Samuel Bowles, *Endogenous Preferences: The Cultural Consequences of Markets and Other Economic Institutions*, 36 J. Econ. Lit. 75, 75 (1998) ("Markets and other economic institutions . . . influence the evolution of values, tastes and personalities. Economists have long assumed otherwise; the axiom of exogenous preferences is as old as liberal political philosophy itself.") [hereinafter Bowles, *Endogenous Preferences*]; George J. Stigler & Gary S. Becker, *De Gustibus Non Est Disputandum*, 67 Am. Econ. Rev. 76, 76–77 (1977) ("[O]ne may usefully treat tastes as stable over time . . . . [N]o other approach of remotely comparable generality and power is available.").

to public policy,[48] and that they are independent of the preferences of others.[49] For convenience, I will refer to all of these related assumptions as the assumption of fixed preferences. Based on the assumption of fixed preferences, economists then explain a person's behavior as the rational, utility-maximizing response to prevailing prices given that person's income and wealth.[50]

Why assume that preferences are fixed? It is possible that some economists actually believe that preferences are more or less stable.[51] Most economists, however, justify the assumption on other grounds.[52] Historically, some economists thought that preference formation was a topic best reserved for psychologists and other social scientists, and they were concerned that preference change was too mysterious a process to be scientifically useful.[53] In addition, taking preferences as given dramatically simplifies the mathematics underlying economic models.[54] Economists often sacrifice descriptive accuracy in the interest of mathematical tractability.[55] Finally, as I discuss in detail below, endogenous preferences complicate social welfare analysis because, instead of measuring welfare based upon the satisfaction of an individual's fixed preferences, we have to compare states of the world

48. Korobkin & Ulen, *supra* note 32, at 1062.

49. Enrique Fatas et al., *Preference Conformism: An Experiment*, 105 Eur. Econ. Rev. 71, 71–72 (2018) (discussing this assumption and providing evidence that it is false).

50. Ernst Fehr & Karla Hoff, *Introduction: Tastes, Castes and Culture: The Influence of Society on Preferences*, 121 Econ. J. F396, F398 (2011) (explaining that, given the assumption of stable preferences, "changes in behavior are explained as responses of optimising agents to changes in prices, information and technology that change the payoffs and the available set of actions"). To be clear, some economists have acknowledged the possibility of endogenous preferences and discussed some of the implications for economic analysis. *E.g.*, Karla Hoff & Joseph Stiglitz, *Striving for Balance in Economics: Towards a Theory of the Social Determination of Behavior*, 126 J. Econ. Behav. & Org. 25, 25–57 (2016); Bowles, *Endogenous Preferences*, *supra* note 47, at 75–111; Thomas A. Marschak, *On the Study of Taste Changing Policies*, 68 Am. Econ. Rev. (Papers & Proc.) 386, 386–91 (1978). But most economic models assume fixed preferences, and most importantly for my purposes, widely accepted views about Pigouvian taxes are based on that assumption.

51. *See* Jennifer Arlen & Lewis A. Kornhauser, *Does the Law Change Preferences?*, 22 Theoretical Inquiries L. 175, 175–81 (2021).

52. *See* Bowles, *Endogenous Preferences*, *supra* note 47, at 102 (stating reasons for the assumption of fixed preferences).

53. *See* Fehr & Hoff, *supra* note 50, at F398–99 (explaining and rejecting this view); Dau-Schmidt, *Preference Shaping*, *supra* note 27, at 84 (explaining that economists have historically taken this position).

54. Dau-Schmidt, *Preference Shaping*, *supra* note 27, at 84.

55. *See* David Weisbach, *Toward a New Approach to Disability Law*, 2009 U. Chi. Legal F. 47, 82, n.78 (2009); Daniel Shaviro, *Beyond the Pro-Consumption Tax Consensus*, 60 Stan. L. Rev. 745, 758 (2007); Korobkin & Ulen, *supra* note 32, at 1054.

in which preferences differ over time, and economists cannot do that easily.[56]

Whatever economists' reasons, their assumption of fixed preferences has enormous implications for policymakers because it implies that government intervention cannot alter people's preferences. In the remainder of this Article, I argue that, contrary to standard economic theory, preferences are not fixed, and in particular, Pigouvian taxes can shape them. I also argue that by assuming that Pigouvian taxes cannot shape preferences, economists have artificially limited the rationale for using them, have understated their potential scope, and have likely exaggerated the harm that they cause to consumers.[57] Moreover, the false assumption of fixed preferences can no longer be justified given the progress that psychologists and other social scientists have made in determining how preferences form.[58]

II. Pigouvian Taxes and Preference Construction

In this Part and the next, I present evidence that preferences are not fixed and, specifically, that policymakers may be able to use Pigouvian taxes to alter them. I argue that the preference-shaping function of Pigouvian taxes can make them more effective than traditionally assumed when it comes to reducing behavior that causes externalities.

Parts II and III rely heavily on recent progress in the social sciences in explaining the determinants of people's preferences. In this Part in particular, I argue that Pigouvian taxes can shape preferences by affecting how they are constructed at the moment of choice.

Before discussing how Pigouvian taxes shape preferences, I should pause to note exactly what I mean by that term. For purposes of this Article, I focus on what Ariel Porat refers to as "internal preferences," which are generated by internal forces.[59] Internal preferences include things like tastes (e.g., a taste for chocolate); personal characteristics and tendencies (e.g., a preference for tidiness); attitudes towards other people (e.g., racist preferences); preferences for ways of life (e.g., a preference to be married rather than single); and values (e.g., a preference for environmentalism).[60] In this Article, I am not concerned

56. *See infra* Part VII.A.2.

57. *Cf.* Linus Mattauch et al., *The Economics of Climate Change with Endogenous Preferences*, 69 Res. & Energy Econ. 1, 3 (2022) (arguing that if transportation infrastructure affects preferences for car ownership in the long run, then cost-benefit analysis that ignores that fact "will understate the benefits of shifting preferences that facilitate low-carbon options").

58. *See* Fehr & Hoff, *supra* note 50, at F398–99.

59. Porat, *supra* note 26, at 218–20.

60. *Id.* at 219.

with "external preferences," which are motivated by external rewards and punishments.[61] A man might, for example, have an internal preference to dress casually, but an external preference to wear a suit to work because dressing casually in that circumstance would hurt his career prospects. In that case, the external preference may win out so that he wears the suit, but he may also complain bitterly about having to do so.

A. Preference Construction Generally

The assumption that preferences are fixed and complete means that people are able to rank order all possible options and that they consistently choose the option that they prefer.[62] This assumption implies that people have "underlying" or "inherent" preferences that are activated or retrieved from memory at the moment of choice.[63] I know that I prefer the taste of Diet Coke to Diet Pepsi and of Diet Pepsi to Dr. Pepper, and given my income, prices, and available options, I consistently choose according to those preferences.

In reality, preferences are often not complete and activated or retrieved from memory, but are instead constructed—often unconsciously—at the moment of choice based on information that is available at the time.[64] A decisionmaker is particularly likely to construct rather than retrieve preferences in instances in which he or she lacks experience and is unfamiliar with a situation or where the decision

61. *Id.* at 218–19.

62. *See* Paul Slovic, *The Construction of Preference*, 50 Am. Psych. 364, 364–70 (1995) (discussing and criticizing this assumption).

63. Caleb Warren et al., *Values and Preferences: Defining Preference Construction*, 2 Wiley Interdisciplinary Rev.: Cognitive Sci. 193, 194 (2011).

64. *E.g.*, Warren et al., *supra* note 63, at 193–202; Ap Dijksterhuis et al., *On Making the Right Choice: The Deliberation-Without-Attention Effect*, 311 Sci. 1005, 1005–07 (2006); Dale Griffin et al., *A New Look at Constructed Choice Processes*, 16 Mktg. Letters 321, 321–29 (2005); Payne et al., *supra* note 46, at 245–46; James R. Bettman et al., *Constructive Consumer Choice Processes*, 25 J. Consumer Rsch. 187, 187–89 (1998); Slovic, *supra* note 62, at 369. While psychologists generally accept the notion of constructed preferences, the extent to which preferences are constructed versus "inherent" and stable is still open to debate. *See, e.g.*, Itamar Simonson, *Will I Like a 'Medium' Pillow? Another Look at Constructed and Inherent Preferences*, 18 J. Consumer Psych. 155, 156–64 (2008); Ran Kivetz et al., *The Synthesis of Preference: Bridging Behavioral Decision Research and Marketing Science*, 18 J. Consumer Psych. 179, 179–85 (2008); Ravi Dhar & Nathan Novemsky, *Beyond Rationality: The Content of Preferences*, 18 J. Consumer Psych. 175 (2008).

is complex and it is hard to evaluate attributes across options.[65] Under these circumstances, the context provides clues as to how to act.[66]

Context matters because people have limited attention and cognitive capacity, which means that they must focus selectively on salient aspects of the choice environment and on thoughts selectively drawn from memory.[67] In some cases, people may voluntarily focus on information that they perceive as relevant to current goals.[68] In other instances, their attention may be captured involuntarily by situational factors that are particularly salient, e.g., because they are novel, surprising, threatening, or perceptually prominent.[69]

The importance of salience means that people's choices are frequently sensitive to subtle differences in context and how a decision is framed. For instance, more people will choose to have a potentially life-saving surgery if they are told that it has a ninety percent survival rate than if they are told that it has a ten percent fatality rate.[70] The survival frame elicits a preference in favor of the surgery because it focuses attention on the high likelihood of success, whereas the fatality frame elicits the opposite preference by making death the more salient feature. Similarly, when preferences are not firmly established, default rules influence choices by implicitly providing guidance about what to do. Substantially more people, for example, will serve as organ donors if the default rule requires that you opt out of organ donation—signaling

65. Yanjun Liu & Jennifer S. Trueblood, *The Effect of Preference Learning on Context Effects in Multi-Alternative, Multi-Attribute Choice*, 233 COGNITION 1, 1–2 (2023); Joachim Vosgerau & Eyal Peer, *Extreme Malleability of Preferences: Absolute Preference Sign Changes under Uncertainty*, 32 J. BEHAV. DECISION MAKING 38, 39 (2018); Warren et al., *supra* note 63, at 200–01; Steve Hoeffler & Dan Ariely, *Constructing Stable Preferences: A Look Into Dimensions of Experience and Their Impact on Preference Stability*, 8 J. CONSUMER PSYCH. 113, 115–16 (1999); Bettman et al., *supra* note 64, at 190–93; *Id*. at 364–70; Jack M. Feldman & John G. Lynch, Jr., *Self-Generated Validity and Other Effects of Measurement on Belief, Attitude, Intention, and Behavior*, 73 J. APPLIED PSYCH. 421, 422–23 (1988).

66. See sources cited *supra* notes 64 and 65.

67. Bettman et al., *supra* note 64, at 193; Daniel Kahneman, *Maps of Bounded Rationality: Psychology for Behavioral Economics*, 93 AM. ECON. REV. 1449, 1458–60 (2003); Steven K. Jones et al., *Choices and Opportunities: Another Effect of Framing on Decisions*, 11 J. BEHAV. DECISION MAKING 211, 213–14 (1998); Paolo Legrenzi et al., *Focussing in Reasoning and Decision Making*, 49 COGNITION 36, 58–64 (1993).

68. Bettman et al., *supra* note 64, at 193.

69. *Id.*

70. Barbara J. McNeil et al., *On the Elicitation of Preferences for Alternative Therapies*, 306 NEW ENG. J. MED. 1259, 1259–62 (1982); *see also* Amos Tversky & Daniel Kahneman, *The Framing of Decisions and the Psychology of Choice*, 211 SCI. 453, 453–58 (1981).

that organ donation is the norm, not the exception—rather than if it requires that you opt in.[71]

Perhaps the most compelling evidence for preference construction comes from studies that show that seemingly trivial and normatively irrelevant aspects of a situation can dramatically influence preferences, even with respect to important decisions.[72] For example, one study found that decisions about whether to attend a particular college are heavily influenced by how cloudy it is on the day that the prospective student visits campus.[73] Another study found that the price that people are willing to pay for consumer goods such as wine can be influenced significantly by first asking them whether they would be willing to pay a price equal to the last two digits of their Social Security number.[74] Suggesting the Social Security number as a possible price causes it to serve as an arbitrary psychological anchor, so those with higher Social Security numbers bid substantially higher for the goods in question than those with lower ones.[75] Other studies have found that preferences can be influenced by subtle primes,[76] a person's incidental emotional state at the moment of choice,[77] and even the ease with which people are able to process the fonts used in advertisements.[78]

Given that preferences are constructed, Pigouvian taxes may affect them—specifically because taxes become part of the context in which

71. *See* Eric J. Johnson & Daniel Goldstein, *Do Defaults Save Lives?*, 302 SCI. 1338, 1338–39 (2003).

72. Context-effects result from situational "factors that have the potential to shift the choice outcome by altering the process by which the decision is made." Raphael Thomadsen et al., *How Context Affects Choice*, 5 CUSTOMER NEEDS & SOLS. 3, 5 (2018). The decision context does not include "[a]spects of the choice environment that merely affect the preferences for the underlying attributes of the product (or choice alternatives in non-product settings)." *Id.* According to this view, an advertisement that cues a comparison between two products would be part of the decision context because it alters the decision process. *Id.* But a reduction in price of an umbrella or rainy weather that causes a person to buy an umbrella would not count as a context-effect because price and weather directly affect the utility from buying an umbrella. *Id.*

73. Uri Simonsohn, *Weather to Go to College*, 120 ECON. J. 270, 271 (2009).

74. Dan Ariely et al., *"Coherent Arbitrariness": Stable Demand Curves Without Stable Preferences*, 118 Q.J. ECON. 73, 74–76 (2003).

75. *Id.*; *cf.* Dan Ariely et al., *Tom Sawyer and the Construction of Value*, 60 J. ECON. BEHAV. & ORG. 1, 1–7 (2006) (presenting evidence that researchers can use subtle cues to manipulate whether subjects view an ambiguous experience as either good or bad).

76. *See* Gavan J. Fitzsimons et al., *Non-Conscious Influences on Consumer Choice*, 13 MKTG. LETTERS 269, 276 (2002).

77. *See* Cynthia E. Cryder et al., *Misery Is Not Miserly: Sad and Self-Focused Individuals Spend More*, 19 PSYCH. SCI. 525, 525–29 (2008); Jennifer S. Lerner et al., *Heart Strings and Purse Strings: Carryover Effects of Emotions on Economic Decisions*, 15 PSYCH. SCI. 337, 339–40 (2004).

78. Nathan Novemsky et al., *Preference Fluency in Choice*, 44 J. MKTG. RSCH. 347, 350 (2007).

preferences are formed. In this section, I argue that policymakers can potentially influence the preference construction process by using Pigouvian taxes to provide risk-related information, to activate socially beneficial goals, and to increase the salience of certain social norms. This view stands in stark contrast to conventional economic theory, which assumes that taxes influence behavior only by increasing the cost of available options, not by altering preferences. I also discuss how public education campaigns and informational nudges can enhance the preference-shaping function of Pigouvian taxes. Finally, I conclude the section by discussing how Pigouvian taxes may backfire—crowding out socially desirable preferences—and how policymakers can avoid this problem.

B. Providing Risk-Related Information

Beliefs about risks influence preferences.[79] Richard McAdams has argued persuasively that laws that mandate or prohibit behavior also influence people's beliefs about risks.[80] If the government mandates the use of seatbelts, that suggests that legislators view the failure to wear a seatbelt as seriously dangerous, which may alter beliefs—at least among those who have faith in their elected representatives to act in the public interest.[81] These altered beliefs may cause people to wear seatbelts even in the absence of strict enforcement. As this example shows, laws that mandate behavior can shape preferences by altering beliefs about risks.

No reason exists to believe that Pigouvian taxes cannot alter beliefs about risks in the same way as mandates.[82] Guns, for example, impose substantial social costs as a result of gun-related violence, suicides, and accidents.[83] A large Pigouvian tax on guns would signal

79. Daniel Hausman & Michael McPherson, *Preference, Belief, and Welfare*, 84 Am. Econ. Rev. (Papers & Proc.) 396, 396–99 (1994).

80. *E.g.*, Richard H. McAdams, The Expressive Powers of Law 153–62 (2015).

81. *Id.* at 153–62. Not everyone, of course, will change their beliefs based upon the signal sent by the legislature, especially where the information received conflicts with fundamental tenets of the person's worldview. *See generally* Dan M. Kahan et al., *Who Fears the HPV Vaccine, Who Doesn't, and Why? An Experimental Study of the Mechanisms of Cultural Cognition*, 34 L. & Human Behav. 501 (2010); Dan M. Kahan & Donald Braman, *Cultural Cognition and Public Policy*, 25 Yale Pol'y Rev. 149 (2006).

82. *Cf.* Samuel Bowles, The Moral Economy: Why Good Incentives Are No Substitute for Good Citizens 79–112 (2016) (arguing that incentives can provide information, including information about the person implementing the incentive and her beliefs about the targeted behavior, e.g., whether it is onerous or not) [hereinafter Bowles, Moral Economy].

83. Over 40,000 Americans die annually as a result of firearm injuries and treatment for firearm injuries costs over $1 billion each year, much of which is borne by taxpayers

that legislators view guns as dangerous, and this would especially be the case if the adoption of the tax were accompanied by a public education campaign highlighting the relevant risks to the public. As a result, a gun tax would likely alter beliefs about risks and ultimately preferences for gun ownership.

C. Goal Activation

Psychologists argue that preferences vary depending on people's goals.[84] A person who has a goal of being healthy will prefer to eat yogurt instead of ice cream because, while ice cream may taste better, yogurt facilitates the health goal. Goals, however, are unstable and vary across time and context, so a person's preferences at any moment depend on which goals are activated at that moment.[85] Shortly after making a new year's resolution to lose weight, a person may eat more salads and less fried foods because the health goal is activated.[86] As the year wears on and the health goal is replaced by the goal to indulge, the preference for salads gives way to a preference for French fries.[87]

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through Medicaid and Medicare. U.S. Gov't Accountability Off., GAO-21-515, Firearm Injuries: Health Care Service Needs and Costs 1 (2021), https://www.gao.gov/products/gao-21-515 [https://perma.cc/27F9-EESY]. For a detailed discussion of the social costs of gun violence, see Griffith & Staudt, *supra* note 4, at 90–93.

84. Warren et al., *supra* note 63, at 197–98; Arthur B. Markman et al., *Preference and the Specificity of Goals*, 2007 Emotion 680, 680–84 (2007); Bettman et al., *supra* note 64, at 192–94; and Stijn M.J. Van Osselaer et al., *Choice Based on Goals*, 16 Mktg. Letters 335, 335–38 (2005).

85. Warren et al., *supra* note 63, at 198; Van Osselaer et al., *supra* note 84, at 337–38; Arthur B. Markman & C. Miguel Brendl, *The Influence of Goals on Value and Choice*, 39 Psych. Learning & Motivation 97, 106–17 (2000). Although he does not use the goal-activation language employed by psychologists, law and economics scholar Robert Cooter makes a similar point. Cooter argues that people have higher-order preferences that guide behavior, but are highly abstract, and lower-order preferences that are more concrete and that determine particular choices. Robert Cooter, *Do Good Laws Make Good Citizens: An Economic Analysis of Internalized Norms*, 86 Va. L. Rev. 1577, 1595–96 (2000) [hereinafter Cooter, *Good Citizens*]. A person might, for example, have a higher-order preference for health that influences his lower-order preferences for particular types of food. Cooter's higher-order preferences are akin to goals and, as Cooter points out, higher-order preferences can explain changes to lower-order preferences. *Id.*; *see also* Tyler Cowen, *The Scope and Limits of Preference Sovereignty*, 9 Econ. & Phil. 253, 264–66 (1993) (discussing the concepts of higher-order and lower-order preferences).

86. *See* Ayelet Fishbach et al., *Leading Us Not unto Temptation: Momentary Allurements Elicit Overriding Goal Activation*, 84 J. Personality & Soc. Psych. 296, 298–306 (2003).

87. *See* C. Miguel Brendl et al., *The Devaluation Effect: Activating a Need Devalues Unrelated Objects*, 29 J. Consumer Rsch. 463, 463–71 (2003); James Y. Shah et al., *Forgetting All Else: On the Antecedents and Consequences of Goal Shielding*, 83 J. Personality & Soc. Psych. 1261, 1264–78 (2002) (discussing how commitment to a

This suggests that taxes can influence preferences by activating certain goals at the moment of choice. Real-world experience with plastic bag taxes illustrates the point. Over 100 billion single-use plastic bags are used annually in the United States alone, and they often end up in landfills or as litter, eventually making their way into rivers and oceans where they present a significant threat to wildlife and are especially problematic due to their longevity.[88] A number of studies have concluded that the external cost per bag is between ten and twenty cents.[89] In recognition of the environmental damage that they cause, a number of cities in the United States (e.g., Washington, D.C. and Chicago) and countries around the world (e.g., Ireland, Wales, and England) have adopted plastic bag taxes.[90] Despite the fact that most of these taxes are quite small—generally ranging from five to ten cents per bag—they have produced dramatic and sustained reductions in plastic bag usage.[91]

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focal goal inhibits alternative goals and why failure to achieve the focal goal may lead to switching to an alternative goal).

88. *See* Travis P. Wagner, *Reducing Single-Use Plastic Shopping Bags in the USA*, 70 WASTE MGMT. 3, 4–6 (2017).

89. For a review of the studies, see *id.* at 7.

90. *E.g.*, Homonoff, *Unintended Consequences*, *supra* note 18, at 231 (discussing the Chicago plastic bag tax); Gregory O. Thomas et al., *The English Plastic Bag Charge Changed Behavior and Increased Support for Other Charges to Reduce Plastic Waste*, 10 FRONTIERS PSYCH. 1, 3 (2019) (discussing the English plastic bag tax); Tatiana A. Homonoff, *Can Small Incentives Have Large Effects? The Impact of Taxes Versus Bonuses on Disposable Bag Use*, 10 AM. ECON. J.: ECON. POL'Y 177, 178 (2018) (discussing plastic bag taxes in Washington, D.C. and Montgomery County, Maryland) [hereinafter Homonoff, *Small Incentives*]; Wouter Poortinga et al., *The Introduction of a Single-Use Carrier Bag Charge in Wales: Attitude Change and Behavioural Spillover Effects*, 36 J. ENV'T PSYCH. 240, 240 (2013) (discussing the Welsh plastic bag tax); Frank Convery et al., *The Most Popular Tax in Europe? Lessons from the Irish Plastic Bags Levy*, 38 ENV'T & RES. ECON. 1, 2 (2007) (discussing the Irish plastic bag tax).

91. See the sources cited *supra* note 90. The Irish tax, at thirty-three cents per bag, is larger than most. *See* Elisabeth Rosenthal, *Motivated by a Tax, Irish Spurn Plastic Bags*, N.Y. TIMES (Feb. 2, 2008), https://www.nytimes.com/2008/02/02/world/europe/02bags.html [https://perma.cc/F8CG-KBDD]. As with any government intervention, plastic bag taxes, fees, and bans can backfire if poorly designed. Effective in 2016, California banned thin plastic bags, but due to the influence of the plastics industry, the legislation created a loophole that allowed stores to charge a small fee for thick, reusable plastic bags. These heavier plastic bags have become popular, but because they are otherwise very similar to ordinary bags, people reuse them infrequently. As a result, the legislation had the intended effect of reducing the number of thin plastic bags used and their associated litter, but it increased the total weight of plastic bags in landfills. *See* Hiroko Tabuchi, *California Tried to Ban Plastic Grocery Bags. It Didn't Work*, N.Y. TIMES (Feb. 15, 2024), https://www.nytimes.com/2024/02/15/climate/california-plastic-bag-ban.html [https://perma.cc/YM88-X2RN]; CAL. DEP'T OF RES. RECYCLING & RECOVERY, SB 270 REPORT TO THE LEGISLATURE: IMPLEMENTATION

How could such a small financial disincentive consistently produce surprisingly large effects across a variety of countries and cultures? Standard economic theory posits that the manner in which a tax affects behavior is by raising the price of a good, so if a small tax on plastic bags significantly reduces demand for them, then that must mean that people are highly sensitive to price. This explanation, however, is not consistent with the fact that plastic bag taxes reduce usage at a similar rate among both poor shoppers, who might actually find them financially burdensome, and rich ones, who could easily afford to pay the small fees imposed.[92] It seems likely, then, that, in addition to simple economics, psychology plays a substantial role in the effectiveness of plastic bag taxes.

Which specific psychological mechanisms are at play? The answer is not completely clear, and causes are likely varied. The evidence, however, suggests that part of the answer is that plastic bag taxes, and the robust public debates and education campaigns that generally surround their adoption, activate the goal of protecting the environment. For example, a longitudinal interview study of attitudes toward the plastic bag tax in England found that, after the tax was implemented, interview participants viewed it positively and "spoke about the charge being an effective policy instrument to reduce plastic bag waste and raise environmental awareness."[93] This study is consistent with news reports from other places that have adopted plastic bag taxes, which suggest that the taxes have made people conscious of the environmental threat that the bags impose.[94] This evidence indicates that a tax on plastic bags activates the goal of environmental protection by presenting people with the means and opportunity to further it.[95] In effect, the tax reminds people of an easy way in which they can help the planet.[96]

Update and Policy Considerations for Management of Reusable Grocery Bags in California 13–16 (2019).

92. Thomas et al., *supra* note 90, at 6–10.

93. *Id.* at 9.

94. *E.g.*, Murray & Reddy, *supra* note 18; Rosenthal, *supra* note 91.

95. *See* Van Osselaer et al., *supra* note 84, at 338–42 (arguing that highlighting the means needed to achieve a goal has the effect of activating the goal); Markman & Brendl, *supra* note 85, at 107 (discussing how situational aspects activate goals); James Y. Shah & Arie W. Kruglanski, *When Opportunity Knocks: Bottom-Up Priming of Goals by Means and Its Effects on Self-Regulation*, 84 J. Personality & Soc. Psych. 1109, 1119–20 (2003) (noting that "the cognitive accessibility of goals . . . are significantly enhanced by the subliminal presentation of their correspondent means").

96. It is very common for people who live in a jurisdiction that imposes a plastic bag tax to point out how, after implementation, they quickly discovered that it is easy to avoid the tax by shopping with reusable bags. *E.g.*, Thomas et al., *supra* note 90, at 7; Murray & Reddy, *supra* note 18.

Plastic bag taxes also likely activate the goal of maintaining a positive self-image. Most people want to maintain a positive self-image and want to perceive themselves as good and moral people and responsible citizens.[97] Moreover, people often interpret the law as signaling behavior that is moral, ethical, or appropriate—especially where they respect the elected officials who adopted it or believe that it represents the view of the majority of citizens.[98] Pigouvian taxes, like the plastic bag tax, can leverage this fact by signaling the types of behavior that society views as appropriate so that people then engage in those behaviors to protect their self-image.[99]

D. Norm Salience

Social norms describe how people ought to act (injunctive norms) or generally do act in a particular circumstance (descriptive norms).[100] They are ubiquitous and influence a wide-range of behaviors—from what foods we eat to what cars we drive to whether we smoke or wear a seatbelt to whether we cooperate in social endeavors that entail personal sacrifice.[101]

People comply with social norms for a variety of reasons, including that, in the presence of a norm, the preference construction process tends to encourage preferences that promote conformity to the norm. Social norms form part of the context within which preferences are constructed, which means that norms are likely to have a powerful influence on the

97. *See* Fredrik Carlsson & Olof Johansson-Stenman, *Behavioral Economics and Environmental Policy*, 4 Ann. Rev. Res. Econ. 75, 80 (2012) (discussing evidence of the desire for a positive self-image as a motivation for environmentally conscious behavior); Roland Benabou & Jean Tirole, *Incentives and Prosocial Behavior*, 96 Am. Econ. Rev. 1652, 1653, 1657 (2006) (discussing the importance of self-image to prosocial behavior and positing that people engage in prosocial behavior as a form of "self-signaling" to reinforce positive self-image).

98. Richard H. McAdams, *An Attitudinal Theory of Expressive Law*, 79 U. Or. L. Rev. 339, 340–41 (2000); Cass R. Sunstein, *On the Expressive Function of Law*, 144 U. Pa. L. Rev. 2021, 2029–33 (1996) [hereinafter Sunstein, *Expressive Function*].

99. *Cf.* Van Osselaer et al., *supra* note 84, at 340 (arguing that "criterion goals," such as the ability to justify a choice to others, affect preferences).

100. Robert B. Cialdini et al., *A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places*, 58 J. Personality & Soc. Psych. 1015, 1024 (1990).

101. Ernst Fehr & Urs Fischbacher, *Social Norms & Human Cooperation*, 8 Trends Cognitive Sci. 185, 186 (2004); Cass R. Sunstein, *Social Norms and Social Roles*, 96 Colum. L. Rev. 903, 914 (1996) [hereinafter Sunstein, *Social Norms*]. For empirical evidence of the influence of norms on behavior, see, e.g., Noah J. Goldstein et al., *A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels*, 35 J. Consumer Rsch. 472, 473–78 (2008); P. Wesley Schultz et al., *The Constructive, Destructive, and Reconstructive Power of Social Norms*, 18 Psych. Sci. 429, 430–33 (2007); Cialdini et al., *supra* note 100, at 1016–24.

choices of people who do not have established preferences relevant to the domain governed by the norm.[102] For example, a new lawyer may not have an established preference with respect to what clothes to wear to work, so she simply takes her cues from others and follows (possibly unconsciously) the dress code that prevails at the first law firm by which she is employed.[103]

Because social norms affect preference construction, the law can shape preferences indirectly through its influence over social norms. Legal scholars have written extensively about law's influence on social norms, but this literature generally ignores the possibility that Pigouvian taxes might have this effect—focusing instead on criminal law and other forms of regulation.[104] There is no reason to believe, however, that Pigouvian taxes are different from other laws with respect to their ability to influence norms.

One way in which Pigouvian taxes can influence social norms is by increasing the likelihood that people will comply with them. In general, people are more likely to comply with a norm when they expect others will comply with it and they expect that others think that they should comply with it.[105] Moreover, people are more likely to comply with a norm when it is more salient and their attention is focused on it at the time they must decide how to act.[106] Whether a norm is salient depends

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102. *E.g.*, Korobkin & Ulen, *supra* note 32, at 1130–31; Sunstein, *Social Norms*, *supra* note 101, at 941 ("We might say, then, that any preference for an action is partly a function of social norms and the agent's attitude toward those norms."). A related psychological concept called "social proof" refers to our natural tendency to look to the behavior of others to determine how we should behave in a particular context. *See* ROBERT B. CIALDINI, INFLUENCE: THE PSYCHOLOGY OF PERSUASION 114–66 (rev. ed. 1993). We are particularly prone to rely on social proof in situations in which we are uncertain about what to do and where we can look (consciously or unconsciously) to guidance from others who are similar to us in terms of nationality, age, and so forth. *Id.* at 128–66.

103. Notice the subtle difference between this situation, in which a social norm influences the construction of a preference that did not previously exist, and a situation in which the new lawyer has a strong internal preference to dress casually, but instead dresses more formally to please the firm's partners.

104. *E.g.*, Richard H. McAdams & Eric B. Rasmusen, *Norms and the Law*, *in* 2 HANDBOOK ON LAW AND ECONOMICS 1575, 1575 (A. Mitchell Polinsky & Steven Shavell eds., 2007); Cooter, *Good Citizens*, *supra* note 85, at 1590; Sunstein, *Social Norms*, *supra* note 101, at 904–65; Robert C. Ellickson, *Of Coase and Cattle: Dispute Resolution Among Neighbors in Shasta County*, 38 STAN. L. REV. 623, 624–85 (1986).

105. Cristina Bicchieri & Erte Xiao, *Do the Right Thing: But Only if Others Do So*, 22 J. BEHAV. DECISION MAKING 191, 191–94 (2009). If people's expectations about what others would do in the situation differ from their expectations about what others think ought to be done, then people tend to do what others would do, even if they know that this behavior would be met with social disapproval. *Id.* at 201–02.

106. Carl A. Kallgren et al., *A Focus Theory of Normative Conduct: When Norms Do and Do Not Affect Behavior*, 26 PERSONALITY & SOC. PSYCH. BULL. 1002, 1110–11 (2000); Cialdini et al., *supra* note 100, at 1024.

on whether there are cues in the environment that prime the norm and that provide information about what people do and think ought to be done in that situation.[107] In addition, while people will use salient, norm-revealing information that is freely available, they appear unwilling to incur costs to obtain it in instances where the norm is ambiguous or unknown.[108] As a result, compliance is more likely when the norm is clear and transparent and information about it is readily available.[109]

The surprising effectiveness of the relatively small plastic bag taxes discussed in Section C suggests that those taxes have had the effect of increasing the salience of a new norm disfavoring plastic bag usage.[110] By virtue of its public nature and specificity, a plastic bag tax makes the norm, i.e., that plastic bags should be avoided, clear and transparent.[111] The adoption of such a tax is usually accompanied by a public debate and education campaign about why it is needed, as well as extensive media coverage describing the views of public officials and other citizens.[112]

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107. Erte Xiao & Cristina Bicchieri, *Words or Deeds? Choosing What to Know About Others*, 187 SYNTHESE 49, 51 (2012); Kallgren et al., *supra* note 106, at 1002–11; Cialdini et al., *supra* note 100, at 1015–24.

108. Xiao & Bicchieri, *supra* note 107, at 57–58.

109. *Id.* at 58–59; *see also* Marco A. Janssen et al., *Lab Experiments for the Study of Social-Ecological Systems*, 328 SCI. 613, 616 (2010) (finding in an experimental setting that the ability to punish other subjects reduces subjects' cooperation in conserving and harvesting a common resource unless the subjects are allowed to communicate about why they choose to punish).

110. In her study of the Montgomery County, Maryland plastic bag tax, Tatiana Homonoff found no evidence that the tax shifted social norms by changing people's attitudes toward plastic bag use after it was implemented. Homonoff, *Small Incentives*, *supra* note 90, at 198–200. However, she measured pre-implementation attitudes before the tax went into effect, but months after it had been adopted, so it is not clear whether the debate surrounding its adoption affected attitudes. *Id.* Moreover, Montgomery County is near Washington, D.C., which had a tax in place two years prior to the adoption of the Montgomery County tax, and the vast majority of Montgomery County residents were familiar with the D.C. tax. *Id.* Thus, the D.C. tax could have shifted social norms related to plastic bag use in Montgomery County even before adoption of the Montgomery County tax. *Id.* Finally, Homonoff's finding is not consistent with the evidence for social norm change presented in the text.

111. *Cf.* Erte Xiao & Daniel Houser, *Punish in Public*, 95 J. PUB. ECON. 1006, 1007–12 (2011) (finding that public punishment reduces free riding in a public goods game more so than private punishment and theorizing that public punishment makes the norm of contributing to the public good clear and salient). Analogously, a number of scholars have argued that legally prohibiting or punishing behavior signals to the public that engaging in that behavior violates social norms. *See generally* Dan M. Kahan, *Social Meaning and the Economic Analysis of Crime*, 27 J. LEGAL STUD. 609 (1998); Sunstein, *Expressive Function*, *supra* note 98.

112. *E.g.*, Saul Pink, *Evanston Proposes 10-Cent Tax on Shopping Bags to Replace 2014 Plastic Bag Ban*, DAILY NW. (June 23, 2022), https://dailynorthwestern.com/2022/06/23/city/evanston-proposes-10-cent-tax-on-shopping-bags-to-replace-2014-plastic-bag-ban/ [https://perma.cc/6K54-HPLY]; Homonoff, *Small Incentives*, *supra* note 90, at 197–98. The notion that, when combined with a public education

The tax itself is imposed each time someone uses a plastic bag—a fact that serves as a frequent reminder of the norm's existence.[113] Once the taxes are implemented, virtually everyone quickly becomes aware of them.[114] A plastic bag tax likely increases the expectation that others will comply with the new norm, both because it increases the cost of noncompliance and people know that it will serve as a salient reminder of the norm to others, thereby increasing the odds that they comply.[115]

Although more research is needed to confirm the point, the study discussed in Section C—finding that the adoption of the English plastic bag tax increased the public's environmental awareness—provides support for the notion that plastic bag taxes alter social norms. The claim also finds anecdotal support in news reports that emphasize that after the taxes are adopted, many people are loathe to use plastic bags and frown on others who do so.[116]

The success of plastic bag taxes in shifting norms could likely be replicated in other areas. For example, many people do not know that meat consumption contributes significantly to global warming.[117] A Pigouvian tax on meat could make this information salient—shifting attitudes in favor of a more plant-based diet. Similarly, a Pigouvian

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campaign conveying information about the norm, a tax could make the norm more salient is consistent with evidence that combining material punishment with communication about a norm results in greater compliance than either punishment or norm communication alone. *See* Daniel Villatoro et al., *The Norm-Signaling Effects of Group Punishment: Combining Agent-Based Simulation and Laboratory Experiments*, 32 Soc. Sci. Comput. Rev. 334, 335 (2014); Charles Noussair & Steven Tucker, *Combining Monetary and Social Sanctions to Promote Cooperation*, 43 Econ. Inquiry 649, 651 (2005). Similarly, the presence of monetary punishment may help sustain a norm over a long period even if the norm requires personal sacrifice for the good of the group. *See* Giulia Andrighetto et al., *Punish and Voice: Punishment Enhances Cooperation when Combined with Norm-Signaling*, 8 PlosOne 1, 1–4 (2013); Noussair & Tucker, *supra* note 112, at 654–58.

113. *See, e.g.*, Lauren Zumbach, *Paper or Plastic? Chicago Bag Tax Is Encouraging Shoppers to Say "Neither"*, Chi. Trib. (Aug. 7, 2017), https://www.chicagotribune.com/business/ct-chicago-bag-tax-use-declined-0808-biz-20170807-story.html [https://perma.cc/2226-K2N2].

114. *See, e.g.*, Homonoff, *Small Incentives*, *supra* note 90, at 197–98 (finding that 98 percent of consumers surveyed about the Montgomery County, MD tax were aware of its existence).

115. *Cf.* Roberto Galbiati & Pietro Vertova, *How Laws Affect Behavior: Obligations, Incentives, and Cooperative Behavior*, 38 Int'l Rev. L. Econ. 48, 54–56 (2014) (presenting experimental evidence that people's beliefs about whether others will comply with a norm increase when that norm is backed by a small incentive, even if it is rarely enforced).

116. Murray & Reddy, *supra* note 18.

117. Ruben Sanchez-Sabate & Joan Sabate, *Consumer Attitudes Towards Environmental Concerns of Meat Consumption: A Systematic Review*, 16 Int'l J. Env't Rsch. & Pub. Health 1220, 1223–24 (2019).

tax on guns would signal that the public has a negative attitude toward gun ownership.[118] For these reasons, taxes on meat and guns would likely reduce meat consumption and gun ownership more than would an equivalent price increase that did not convey information about the public's attitudes toward these behaviors.[119]

E. Taxes, Education Campaigns, and Informational Nudges

We have seen that, contrary to economic theory, Pigouvian taxes do more than just change prices. They can shape preferences by conveying information about risks, activating certain goals, and making particular social norms salient. This section explains how public education campaigns and informational nudges can enhance the preference-shaping function of taxes.

I have already discussed how combining a public education campaign with a Pigouvian tax facilitates goal activation and increases norm salience. Public education campaigns are also important because they provide information about why a Pigouvian tax is necessary.[120] A tax on guns, for example, would likely be perceived as a revenue grab or a tyrannical infringement on basic liberties unless it is accompanied by a serious attempt to educate the public about the substantial social costs of gun ownership. This is particularly true in the contemporary United States, where affection for gun rights is so closely tied to membership in the Republican Party. A gun tax proposed by Democrats would be

118. In fact, a majority of Americans favor stricter gun laws. Sara Burnett, *AP-NORC Poll: Most in US Say They Want Stricter Gun Laws*, AP News (Aug. 23, 2022), https://apnews.com/article/gun-violence-covid-health-chicago-c912ecc5619e925c5ea7447d36808715 [https://perma.cc/XZ4A-LL49]; Pew Rsch. Ctr., Key Facts About Americans and Guns (2021), https://www.pewresearch.org/short-reads/2021/09/13/key-facts-about-americans-and-guns/ [https://perma.cc/6C8R-JWCT].

119. *Cf.* McAdams, *supra* note 80, at 150 (arguing that, by signaling the public's negative attitude toward guns, gun control laws are likely to reduce even gun ownership that is legally permitted).

120. *Cf.* Michael P. Vandenbergh et al., *Regulation in the Behavioral Era*, 95 Minn. L. Rev. 715, 719, 755–56 (2011) (arguing that pairing "economic disincentives, such as taxes and fines, with public education campaigns that highlight the moral case for adoption of the target behavior" can "produce synergistic gains"). Although his example does not involve taxes, Kenneth Dau-Schmidt has presented evidence that, in the 1980s and 1990s, public service announcements combined with criminal laws to alter preferences in favor of seatbelt use and against drunk driving. Dau-Schmidt, *Legal Prohibitions*, *supra* note 26, at 159–60. The shift in preferences was dramatic. *Id.* Since the early 1980s, seatbelt usage has increased dramatically and the opposite has occurred with respect to drunk driving. Nat'l Highway Transp. Safety Admin., Statistical Analysis of Alcohol-Related Driving Trends, 1982–2005, at v–ix (2008); Centers for Disease Control, *Increased Safety-Belt Use–United States, 1991*, Morbidity & Mortality Weekly Report 421 (June 19, 1992), https://www.cdc.gov/mmwr/preview/mmwrhtml/00016921.htm [https://perma.cc/9CBL-SZCQ].

greeted by many with suspicion simply by virtue of the source of the proposal.[121]

Given the importance of information, we might ask whether, in the presence of a robust education campaign, a Pigouvian tax is really needed to alter preferences. For instance, the government could, in theory, communicate the environmental harm resulting from plastic bags without imposing a tax on them—relying solely on an education campaign to prime the goal of environmental protection and shift social norms away from plastic bag usage. The tax, however, is crucial. The message that plastic bags are harmful will not receive as much media attention and will not be as salient without the prospect of a tax. Moreover, the adoption of a tax increases credibility by signaling that elected officials and a majority of citizens believe that the extent of the harm imposed is sufficient to justify government action that goes beyond providing information.[122]

In addition to education campaigns, another promising possibility is to combine taxes with nudges. A nudge is a policy intervention that guides people in a particular direction but does not significantly alter material incentives and ultimately allows them to go their own way if they choose.[123] Examples include a default rule that people are organ donors unless they fill out a form to opt out or a requirement that restaurants display calorie information on their menus. Taxes are not nudges because they alter material incentives. Taxes and nudges, however, can reinforce one another.

More specifically, informational nudges can potentially make preference-shaping taxes more effective.[124] For instance, a potential

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121. People's views on various policy-relevant facts are colored by their values and by the values of what Dan Kahan refers to as identity-defining affinity groups, which could include political parties. Dan M. Kahan, *The Politically Motivated Reasoning Paradigm, Part 1: What Politically Motivated Reasoning Is and How to Measure It*, *in* Emerging Trends in the Social and Behavioral Sciences: An Interdisciplinary, Searchable, and Linkable Resource 1, 2 (Robert A. Scott & Stephen M. Kosslyn eds., 2016).

122. *Cf.* McAdams, *supra* note 80, at 145–46 (arguing that the adoption of a law may provide more credible evidence of public attitudes than polling data because polls can be easily manipulated and the law may be more visible than polls).

123. Cass R. Sunstein, *Nudges, Agency, and Abstraction: A Reply to Critics*, 6 Rev. Phil. Psych. 511, 511 (2015) [hereinafter Sunstein, *Nudges*].

124. I should point out that there is an ongoing debate over how much behavioral change nudges cause. *See generally* Maximillian Maier et al., *No Evidence for Nudging After Adjusting for Publication Bias*, 119 PNAS 1 (2022); Stephanie Mertens et al., *The Effectiveness of Nudging: A Meta-Analysis of Choice Architecture Interventions Across Behavioral Domains*, 119 PNAS 1 (2022); PNAS, *Correction for Mertens et al., The Effectiveness of Nudging: A Meta-Analysis of Choice Architecture Interventions Across Behavioral Domains*, 119 PNAS 1 (2022).

problem with a Pigouvian tax on gasoline is that it only works if people respond to it by driving more fuel-efficient cars. Some evidence, however, suggests that people irrationally ignore fuel-efficiency in making car purchases because of a myopic tendency to ignore future gasoline costs, which defeats the purpose of increasing the gas tax.[125] Combining a gas tax with a well-designed informational nudge—one that reminds people at the time when they are about to purchase a car of the strong relationship between fuel-efficiency and gas costs—would likely make both the tax and the benefits of fuel-efficiency more salient, thereby altering preferences in favor of more fuel-efficient cars.[126]

F. Crowding Out

As explained in Part I, standard economic models imply a role for Pigouvian taxes because the models assume that people generate externalities by selfishly ignoring the external costs of their behavior. In fact, people are not always selfish, and they sometimes internalize external costs even in the absence of Pigouvian taxes or other forms of regulation. For example, environmentalists may voluntarily bike to work to reduce their carbon footprint. People may voluntarily act in a prosocial manner for a variety of reasons, including adherence to a moral code, empathy, altruistic concern for the welfare of others, a conditional willingness to reciprocate when others cooperate in a socially beneficial way, the reputational effects of complying with social norms of cooperation, and the positive effects on self-image.[127]

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125. *E.g.*, Kenneth T. Gillingham et al., *Consumer Myopia in Vehicle Purchases: Evidence from a Natural Experiment*, 13 Am. Econ. J.: Econ. Pol'y 207, 208–09 (2021); Denvil Duncan et al*., Most Consumers Don't Buy Hybrids: Is Rational Choice a Sufficient Explanation?*, 10 J. Cost-Benefit Analysis 1, 1–4 (2019). The evidence on this point is mixed. *See, e.g.*, Hunt Allcott & Christopher Knittel, *Are Consumers Poorly Informed about Fuel Economy? Evidence from Two Experiments*, 11 Am. Econ. J.: Econ. Pol'y 1, 1 (2019); Hunt Allcott et al., *Energy Policy with Externalities and Internalities*, 112 J. Pub. Econ. 72, 74 (2014).

126. On the effects of providing information about fuel efficiency, see Daniel C. Feiler & Jack B. Soll, *A Blind Spot in Driving Decisions: How Neglecting Costs Puts us in Overdrive*, 98 Climatic Change 285, 286–90 (2010). On the ability of nudges generally to influence preferences, see Sunstein, *Nudges*, *supra* note 123, at 513; Brigette C. Madrian, *Applying Insights from Behavioral Economics to Policy Design*, 6 Ann. Rev. Econ. 663, 676 (2014) (arguing that default rules influence preference construction because people sometimes perceive them as an implicit recommendation about how to act).

127. *E.g.*, Geoffrey Heal, *Interdependent Preferences and the Mitigation of Market Failure* 2–5 (Nat'l Bureau Econ. Rsch., Working Paper No. 29967, 2022); Mizuho Shinada & Toshio Yamagishi, *Punishing Free Riders: Direct and Indirect Promotion of Cooperation*, 28 Evolution & Human Behav. 330, 331 (2007); Joel Sobel, *Interdependent Preferences and Reciprocity*, 43 J. Econ. Literature 392 (2005); Simon Gächter & Armin Falk, *Reputation and Reciprocity: Consequences for*

Voluntary, prosocial behavior is beneficial because it can reduce the size of an externality even in the absence of government intervention.[128] Nevertheless, where voluntary actions do not eliminate an externality entirely, a Pigouvian tax may still be warranted. A potentially significant problem arises, however, if adoption of the Pigouvian tax crowds out voluntary prosocial behavior, thereby reducing the effectiveness of the tax.[129]

Perhaps the most well-known example of crowding out comes from an experiment involving Israeli daycares.[130] Researchers were studying the effects of monetary incentives, and at their behest, the daycares began imposing a small fine on parents if they picked up their children late.[131] The fine backfired and actually increased the rate of tardy pick-ups.[132] Apparently, prior to the fine, many parents took pains to be on time—perhaps out of concern for the daycare staff—but the imposition of the fine eliminated this voluntary, prosocial behavior.[133]

Similar crowding-out effects have been demonstrated empirically in a variety of contexts involving monetary incentives.[134] Unlike the daycare example in which the fine completely backfired, in many cases, crowding out is only partial, though it is still deleterious. Partial crowding out occurs when a financial penalty has the intended effect of reducing the targeted behavior, but, because of a concomitant reduction in voluntary, prosocial behavior, the penalty reduces the behavior by less than would be expected given the price increase.[135]

It is important to understand why crowding out might occur in response to a Pigouvian tax so that policymakers can take steps to avoid it.

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the Labour Relation, 104 Scandinavian J. Econ. 1, 17–18 (2002); Urs Fischbacher et al., *Are People Conditionally Cooperative? Evidence from a Public Goods Experiment*, 71 Econ. Letters 397, 400–01 (2001).

128. Heal, *supra* note 127, at 11–20.

129. For an extensive review of the literature on crowding out, see Bowles, Moral Economy, *supra* note 82, at 46–223.

130. Uri Gneezy & Aldo Rustichini, *A Fine Is a Price*, 29 J. Legal Stud. 1 (2000).

131. *Id.* at 3–5.

132. *Id.* at 5–8.

133. *Id.* at 13–15.

134. *E.g.*, Dan Ariely et al., *Doing Good or Doing Well? Image Motivation and Monetary Incentives in Behaving Prosocially*, 99 Am. Econ. Rev. 544, 545–46 (2009); Samuel Bowles, *Policies Designed for Self-Interested Citizens May Undermine "The Moral Sentiments": Evidence from Economic Experiments*, 320 Sci. 1605, 1605–09 (2008); Benabou & Tirole, *supra* note 97, at 489–91; Bruno S. Frey & Reto Jegen, *Motivation Crowding Theory*, 15 J. Econ. Surv. 589, 596–606 (2001).

135. Bruno Lanz et al., *The Behavioral Effect of Pigovian Regulation: Evidence from a Field Experiment*, 87 J. Env't Econ. & Mgmt. 190, 198–200 (2018); Samuel Bowles & Sandra Polanía-Reyes, *Economic Incentives and Social Preferences: Substitutes or Complements?*, 50 J. Econ. Literature 368, 380–82 (2012).

The potential causes are varied. First, the presence of a tax may cause people to conclude that they are paying for the right to engage in the antisocial behavior—effectively absolving them of guilt for doing so.[136] Second, the tax may change a person's perception of the situation as one that should be guided by social norms that implicate morality and cooperation, to one that implicates market norms involving calculation of costs and benefits and a focus on self-interest.[137] Third, the tax may cast doubt on the true motive for a behavior—suggesting that the person behaves as she does in order to avoid the tax rather than out of altruistic concern for others.[138] By altering the social meaning of the behavior, the tax may eliminate both the reputational and self-image effects of voluntarily acting in a prosocial manner.[139] Fourth, the tax may signal that many people engage in the taxed activity, such that doing so is in fact the descriptive norm, even if it runs counter to the injunctive norm.[140] In the daycare experiment, for instance, imposing the fine may have undermined the injunctive norm against tardy pick-ups by

136. Psychologists refer to this phenomenon as "moral licensing." *See generally* Irene Blanken et al., *A Meta-Analytic Review of Moral Licensing*, 41 PERSONALITY & SOC. PSYCH. BULL. 540 (2015).

137. Behavioral economists refer to this phenomenon as "the perception-shift hypothesis." Jian Li et al., *Neural Responses to Sanction Threats in Two-Party Economic Exchange*, 106 PNAS 16835, 16835 (2009); *see also* Armin Falk & Nora Szech, *Morals and Markets*, 340 SCI. 707, 708–09 (2013).

138. Psychologists call this "the overjustification effect." *Cf.* Edward Deci et al., *A Meta-Analytic Review of Experiments Examining the Effects of Extrinsic Rewards on Intrinsic Motivation*, 125 PSYCH. BULL. 627, 630–32 (1999) (detailing high-level research on the overjustification effect); Mark R. Lepper et al., *Undermining Children's Intrinsic Interest with Extrinsic Reward: A Test of the "Overjustification" Hypothesis*, 28 J. PERSONALITY & SOC. PSYCH. 129, 129–31 (1973) (investigating how extrinsic rewards that are unnecessarily high may reduce intrinsic motivation).

139. *Cf.* Carl Mellström & Magnus Johannesson, *Crowding Out in Blood Donation: Was Titmuss Right?*, 6 J. EUR. ECON. ASS'N 845, 857–58 (2008) (finding that giving monetary rewards for donating blood may reduce the overall supply of blood donors by decreasing the reputational value of engaging in that prosocial activity); Benabou & Tirole, *supra* note 97, at 1653–62.

140. *Cf.* P. Wesley Schultz et al., *Using Normative Social Influence to Promote Conservation Among Hotel Guests*, 3 SOC. INFLUENCE 4, 17–18 (2008) (presenting evidence that prosocial messages are more likely to encourage a desired behavior when the messaging aligns both injunctive and descriptive norms); Robert B. Cialdini, *Crafting Normative Messages to Protect the Environment*, 12 CURRENT DIRECTIONS PSYCH. SCI. 105, 105–09 (2003) (presenting evidence that public service announcements become less effective—and can even backfire—when they emphasize that many people are engaging in a socially harmful behavior because they imply that the descriptive norm is not aligned with the injunctive norm); MCADAMS, *supra* note 80, at 162–65 (arguing that increasing the penalty for violating a law may cause people to conclude that undetected violations occur more frequently than previously believed, which may increase violations among those whose compliance was reciprocal in nature and based on the belief that compliance was the norm).

suggesting that many parents in fact violate it—hence the need for a fine. Finally, the tax may signal to citizens that the government does not trust them to act responsibly and wants to control their behavior—infringing upon their autonomy—which may cause them to resist the attempted manipulation.[141]

To understand the problem that crowding out presents for Pigouvian taxes, consider a carbon tax. The point of a carbon tax is to incentivize people to take steps to reduce carbon emissions. But people who are intrinsically motivated to protect the environment may already be taking those steps, e.g., by driving a hybrid car. If the government imposes a carbon tax, then some of these people may feel as if they can now pay to pollute, absolving them of guilt, or they may no longer receive the reputational and self-image benefits of driving a fuel-efficient car because it appears that their motive is a selfish one, i.e., avoiding the tax. As a result, they may switch from a hybrid car to a gas-guzzling SUV.

Fortunately, the causes of crowding out point to a potential solution. What most of the sources of crowding out have in common is that they relate to the construction of preferences. We have seen that when preferences are constructed, context matters, and a Pigouvian tax can be part of the context that shapes preferences—specifically by providing information relevant to the decision at hand.[142] Crowding out occurs because the information provided by the tax—for example, that market norms, not social norms, are appropriate for the situation—triggers antisocial preferences.

This preference-construction explanation suggests that the government may be able to reduce crowding out by altering the information provided by the tax.[143] Research indicates that this is possible if the public trusts the politicians adopting the tax and does not perceive the tax as a punishment intended to control their behavior and infringe upon their autonomy, but instead views it as a mechanism to ensure cooperation.[144] The government should also communicate the

141. Bowles & Polanía-Reyes, *supra* note 135, at 372–74; *see also* Deci, *supra* note 138, at 628–29 (explaining how rewards that are perceived as overly controlling may result in decreased intrinsic motivation).

142. *See* BOWLES, MORAL ECONOMY, *supra* note 82, at 85 (arguing "that preferences are situation-dependent and that the presence and nature of incentives are part of the situation").

143. *See* Bowles & Polanía-Reyes, *supra* note 135, at 418 ("What accounts for crowding out, we believe, is the meaning of the fines or subsidies to the target of the incentives.").

144. *See* Mattauch et al., *supra* note 57, at 9 (arguing that whether a carbon tax crowds out prosocial behavior is likely related to the trust that people have in the politicians who adopted it and communication surrounding its adoption); *see*

need for the tax—the social norm that it embodies.[145] The government should avoid the implication that the taxed behavior is common, but instead should suggest that, after the tax is adopted, people will cooperate by behaving in a prosocial manner and those who do so will not be exploited by free riders.[146] Moreover, the government should emphasize that reducing consumption of the taxed good is socially beneficial, rather than portraying it as a self-interested act taken simply to avoid the tax.[147]

III. Pigouvian Taxes and The Formation of Stable Preferences

In Part II, we saw that when preferences are not firmly established, Pigouvian taxes can influence them by becoming part of the context in which they are constructed. Constructed preferences, however, are potentially ephemeral in the sense that they occur at the moment of choice, but then may change later as a result of (possibly subtle) changes in the situation.[148]

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also Wendelin Schnedler & Radovan Vadovic, *Legitimacy of Control*, 20 J. Econ. & Mgmt. Strategy 985, 986, 1002 (2011) (indicating that control exercised by an authority viewed as legitimate can avert antisocial behavior, while control exercised by an authority viewed as illegitimate may provoke unwanted behavior). In addition to crowding out, a tax may backfire due to psychological reactance, especially where the tax is perceived as an unwarranted restriction on freedom. For example, a person who dislikes those in charge of the government might respond to a plastic bag tax by using more plastic bags, not fewer. For a recent review of reactance theory, see generally Christina Steindl et al., *Understanding Psychological Reactance: New Developments and Findings*, 223 Zeitschrift Psych. 205 (2015).

145. *See* Jean-Robert Tyran & Lars P. Feld, *Achieving Compliance When Legal Sanctions Are Non-Deterrent*, 108 Scandinavian J. Econ. 135, 153–54 (2006) (presenting experimental evidence that mild sanctions for free riding imposed exogenously by the experimenter do not promote cooperation, but they do have that effect if voted on by the subjects, which suggests that the latter signals a norm of cooperation).

146. *See* Fredrik Carlsson & Olof Johansson-Stenman, *Behavioral Economics and Environmental Policy*, 4 Ann. Rev. Res. Econ. 75, 83–84 (2012); Karine Nyborg, *Will Green Taxes Undermine Moral Motivation?*, 10 Pub. Fin. & Mgmt. 331, 343–46 (2010); Bowles & Polanía-Reyes, *supra* note 135, at 410; Mizuho Shinada & Toshio Yamagishi, *Punishing Free Riders: Direct and Indirect Promotion of Cooperation*, 28 Evolution & Hum. Behav. 330, 337–38 (2007).

147. *See* Bowles, Moral Economy, *supra* note 82, at 206; *see also* Mellström & Johannesson, *supra* note 139, at 857–58 (noting that, in an experiment testing the impact of monetary incentives on blood donations, allowing participants to donate their reward to charity may have counteracted the crowding out effect by providing an alternative pathway for individuals to signal their altruism); Benabou & Tirole, *supra* note 97, at 1653–62.

148. *See* Dan Simon et al., *The Transience of Constructed Preferences*, 21 J. Behav. Decision Making 1, 11–12 (2007).

People do, however, have many preferences that are more stable and less dependent on local context in the sense that they seem to persist and manifest themselves more or less consistently over time and across a variety of situations.[149] My preference for Diet Coke would likely qualify. Nonetheless, findings in psychology suggest that "context-independent preferences, while relatively stable, are not necessarily static and could exhibit a slow evolution over time due to intrinsic changes in tastes, e.g., shifts in loyalty or variety seeking, or other preference dynamics, e.g., learning, experience, or satiation."[150]

In this Part, I argue that Pigouvian taxes can influence the formation of more stable, longer-term preferences by altering people's choices and behavior. As we have seen, standard economic theory holds that people have preferences and these preferences determine their choices. Psychology research, however, shows that, in some cases, the direction of causation is actually reversed so that the choices that we make determine our future preferences. Given that fact, Pigouvian taxes may alter future preferences indirectly because they first alter choices—either by raising the prices of taxed goods or by influencing preference construction.

In Section A, I describe the specific psychological mechanisms that produce stable preferences. In Section B, I explain how Pigouvian taxes can shape preferences indirectly by exploiting these mechanisms.

A. The Mechanisms of Preference Formation

When people have substantial experience with a situation or category of products, their preferences may not be constructed at the moment of choice, but may instead be retrieved from memory, or their behavior may become more automatic and cue-driven.[151] Having sampled many types of soda, I no longer hesitate before ordering Diet Coke. Similarly, in a study in which school children were given lunch with either French fries or apple slices as the default side dish and then asked if they would like to switch, ninety-five percent chose French fries when it was the default and ninety-six percent did so when it was

149. Kivetz et al., *supra* note 64, at 182–83.

150. *Id.* at 183.

151. Joachim Vosgerau & Eyal Peer, *Extreme Malleability of Preferences: Absolute Preference Sign Changes under Uncertainty*, 32 J. BEHAV. DECISION MAKING 38, 39 (2018); Steve Hoeffler et al., *Preference Exploration and Learning: The Role of Intensiveness and Extensiveness of Experience*, 23 J. CONSUMER PSYCH. 330, 330 (2013) ("The primary event that influences preference learning is experience."); Warren et al., *supra* note 63, at 200–01; Simonson, *supra* note 64, at 161–63; Hoeffler & Ariely, *supra* note 65, at 115–16; Bettman et al., *supra* note 64, at 188.

not.[152] While default rules sometimes powerfully influence behavior, children have such a strong and well-defined preference for French fries over apple slices that altering the default rule in this case did not make a difference.

How then did I come to prefer Diet Coke over other brands of soda, and why do children prefer French fries over apple slices? One answer is that some preferences are innate and biologically based. Even at a very young age, children exhibit a strong preference for energy-producing sugars and an aversion to the bitter tastes that are often associated with toxic substances.[153] Not surprisingly, then, they nearly universally prefer sweet treats over bitter vegetables.[154]

For the most part, though, people are not born with a set of immutable preferences, but instead discover what they like through exploration, experience, and learning.[155] In some cases, experience with a situation or product category may allow people to determine their own ideal tradeoffs among the various option attributes and to make the choice that is the best fit for them.[156] The type of preference learning that occurs as a result of experimentation may produce preferences that are similar to those assumed by economic theory—preferences that are more or less fixed and not very susceptible to the influence of trivial contextual factors and that also maximize utility.[157]

Having said that, it is unclear the extent to which people are willing to devote time, effort, and cognitive resources to preference learning, even when the stakes are high. For example, as I mentioned in Part II, there is evidence that people irrationally underinvest in fuel-efficient cars. In other words, in exchange for saving one dollar in fuel over the lifetime of the car (discounted to present value), they are only willing to pay substantially less than one additional dollar for a fuel-efficient car. At least part of the explanation appears to be that people put very

152. David R. Just & Brian Wansink, *Smarter Lunchrooms: Using Behavioral Economics to Improve Meal Selection*, 24 Choices 1, 5 (2009).

153. Julie A. Mennella & Gary K. Beauchamp, *The Role of Early Life Experiences in Flavor Perception and Delight*, *in* Obesity Prevention: The Role of Brain and Society on Individual Behavior 203, at 203–10 (Laurette Dube et al., eds., 2010).

154. *Id.*

155. Hoeffler et al., *supra* note 151, at 330–40; Kivetz, *supra* note 64, at 183–84.

156. *See* Hoeffler & Ariely, *supra* note 65, at 136–37; Simonson, *supra* note 64, at 156–64. In particular, breadth of experience with a variety of different but related options facilitates preference learning. Hoeffler et al., *supra* note 151, at 339.

157. *See* Hoeffler & Ariely, *supra* note 65, at 136–37 ("[T]he economic perspective provides a good approximation of experienced consumers."); Eloise Coupey et al., *Product Category Familiarity and Preference Construction*, 24 J. Consumer Rsch. 459, 460–67 (1998); Irwin P. Levin & Gary J. Gaeth, *How Consumers Are Affected by the Framing of Attribute Information Before and After Consuming the Product*, 15 J. Consumer Rsch. 374, 376 (1988).

little thought into fuel economy, despite the substantial financial stakes. In one study of how people make decisions about fuel efficiency, of the fifty-seven households interviewed, none reported analyzing fuel costs in a systematic way in connection with recent car purchases, and only two "offer[ed] plausible willingness to pay answers arrived at through a process that could be described as economically rational (rather than through simple guessing)."[158] Moreover, forty percent of Americans report that they "did not think about fuel costs at all" in connection with their most recent car purchase.[159]

Moreover, even when people do take steps to learn their preferences, the seemingly stable preferences that result from learning may not be uniquely utility-maximizing. Instead, these preferences may be the product of familiarity and habit or the result of biased search processes and could therefore easily have been different if the person's experiences had been different.[160]

In this Section, I describe the various psychological mechanisms that produce stable preferences. All of these mechanisms suggest that economic theory may have causation reversed. Instead of preferences determining choices, the choices that people make, the way that they behave, and the experiences that they have will often powerfully shape their future preferences.

1. Path-Dependent Learning

The preferences discovered through learning and exploration are not necessarily inevitable or utility maximizing, but are instead path dependent.[161] Early experiences and biased search play a significant role. For example, if people have an initial experience with a product that they find favorable, they narrow the breadth of their search for possible alternatives and engage in less experimentation than if their initial experience is somewhat unfavorable, and this biased search process ultimately inhibits preference learning and can prevent the person from discovering the utility-maximizing option.[162] The reason is that people undervalue experimentation; they myopically overvalue the immediate satisfaction resulting from a safe choice and avoid risking

158. Thomas S. Turrentine & Kenneth S. Kurani, *Car Buyers and Fuel Economy?*, 35 ENERGY POL'Y 1213, 1213–19 (2007).

159. Hunt Allcott, *Consumers' Perceptions and Misperceptions of Energy Costs*, 101 AM. ECON. REV. 98, 100 (2011).

160. *See infra* text at notes 159–200.

161. Steve Hoeffler et al., *Path Dependent Preferences: The Role of Early Experience and Biased Search in Preference Development*, 101 ORG. BEHAV. & HUM. DECISION PROCESSES 215, 215 (2006).

162. *Id.* at 227.

disappointment with an unknown alternative.[163] Because of path-dependent learning, our future preferences depend on our past choices and experience.

2. *Self-Herding*

We saw in Part II that a person's actions are sometimes unconsciously influenced by trivial situational factors, such as the weather influencing the choice of college or an arbitrary anchor determining how much a person is willing to pay for a particular bottle of wine. These seemingly arbitrary choices can lead to the formation of stable, long-term preferences through a process that behavioral economists refer to as "self-herding," which is a form of path-dependent learning.[164] Once a person has made a choice or taken an action, the person then observes this past behavior and—no matter what the actual reason for it—she attributes her choice to engage in it to the underlying utility of the action, which provides an impetus to repeat the choice.[165] The person then acts accordingly—e.g., by remaining loyal to the college or continuing to pay a high price for that brand of wine—forming a seemingly stable and coherent preference, even though the initial action was arbitrary and unrelated to utility.[166]

In this way, past choices determine future preferences.[167] In fact, recent research suggests that simply choosing an option creates a future preference for that same option, regardless of the outcome of the choice, and that these choice-induced preference changes stem from alterations to the hippocampal region of the brain caused by the act of deciding.[168]

3. *The Mere Exposure Effect*

The mere exposure effect is the finding that repeated exposure to a stimulus (familiarity) increases liking for it,[169] which may occur even

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163. *Id.*

164. *See* Dan Ariely, Predictably Irrational: The Hidden Forces That Shape Our Decisions 38–40 (rev. ed. 2009); Dan Ariely & Michael I. Norton, *How Actions Create—Not Just Reveal—Preferences*, 12 Trends In Cognitive Sci. 13, 14 (2007).

165. *See* Ariely & Norton, *supra* note 164, at 13.

166. *Id.* at 14–15.

167. Ariely, *supra* note 164, at 38–40.

168. Lennart Luettgau et al., *Decisions Bias Future Choices by Modifying Hippocampal Associative Memories*, 11 Nature Comm. 1, 7–8 (2020).

169. The mere exposure effect was first identified by Robert Zajonc. Robert B. Zajonc, *Attitudinal Effects of Mere Exposure*, 9 J. Personality & Soc. Psych. 1, 1 (1968) [hereinafter Zajonc, *Mere Exposure*]. For more recent reviews of the literature, see R. Matthew Montoya et al., *A Re-Examination of the Mere Exposure Effect: The Influence of Repeated Exposure on Recognition, Familiarity, and Liking*, 143 Psych.

when the person is not aware that they have previously been exposed to the stimulus.[170] Across many domains, we develop a taste for the goods and activities that we have encountered frequently. The mere exposure effect has been documented for a variety of stimuli such as food,[171] cartoons,[172] brand names,[173] made-up words,[174] faces,[175] and music.[176] For example, children who are repeatedly exposed to a particular fruit or vegetable over a short period become more likely to eat it later on.[177]

The mere exposure effect has several causes. First, the more we are exposed to a stimulus, the easier it is for our brains to process it.[178] Psychologists refer to this phenomenon as "fluency," and it creates a preference for familiar objects.[179] Second, as we become habituated to a stimulus, our brains respond less to it, and this decreasing responsiveness may cause us to view it more positively.[180]

BULL. 459 (2017) and Robert F. Bornstein, *Exposure and Affect: Overview and Meta-Analysis of Research, 1968-1987*, 106 PSYCH. BULL. 265 (1989). Familiarity does not always lead to liking. *See* Michael I. Norton et al., *Less Is More: The Lure of Ambiguity, or Why Familiarity Breeds Contempt*, 92 J. PERSONALITY & SOC. PSYCH. 97, 98–101 (2007) (finding that, on average, the more people learn about another person, the less they like them because familiarity highlights dissimilarities).

170. Robert B. Zajonc, *Feeling and Thinking: Preferences Need No Inferences*, 25 AM. PSYCH. 151, 160–61 (1980); Chris Janiszewski, *Preattentive Mere Exposure Effects*, 20 J. CONSUMER RSCH. 376, 378–90 (1993).

171. *E.g.*, Lisa Methven et al., *Changes in Liking of a No-Salt Added Soup as a Function of Exposure*, 26 FOOD QUALITY & PREFERENCE 135, 138 (2012); Susan A. Sullivan & Leann L. Birch, *Pass the Sugar, Pass the Salt: Experience Dictates Preference*, 26 DEVELOPMENTAL PSYCH. 546, 546–51 (1990); Christian S. Crandall, *The Liking of Foods as a Result of Exposure: Eating Doughnuts in Alaska*, 125 J. SOC. PSYCH. 187, 191–92 (1985); Patricia Pliner, *The Effects of Mere Exposure on Liking of Edible Substances*, 3 APPETITE 283, 287–88 (1982).

172. Connie Schick et al., *Perception of Cartoon Humor as a Function of Familiarity and Anxiety Level*, 24 J. PERSONALITY & SOC. PSYCH. 22, 24 (1972).

173. Janiszewski, *supra* note 170, at 378–90.

174. Zajonc, *Mere Exposure*, *supra* note 169, at 14–17.

175. Eddie H. Jones & John J.B. Allen, *The Role of Affect in the Mere Exposure Effect: Evidence from Psychophysiological and Individual Differences Approaches*, 27 PERSONALITY & SOC. PSYCH. BULL. 889, 895 (2001).

176. *See, e.g.*, Guy Madison & Gunilla Schiode, *Repeated Listening Increases the Liking for Music Regardless of Its Complexity: Implications for the Appreciation and Aesthetics of Music*, 11 FRONTIERS NEUROSCIENCE 1, 11 (2017) (finding that "familiarity is the single most important predictor for liking of music independent of genre, timbre, structure, complexity and other factors, and that repeated listening can increase the liking of almost any piece of music if listened to under natural circumstances").

177. Mennella & Beauchamp, *supra* note 153, at 212.

178. Rolf Reber et al., *Effects of Perceptual Fluency and Affective Judgements*, 10 PSYCH. SCI. 45, 45 (1998).

179. *Id.*; Novemsky et al., *supra* note 78, at 348 (reviewing evidence for this proposition).

180. Richard L. Moreland & Robert B. Zajonc, *Is Stimulus Recognition a Necessary Condition for the Occurrence of Exposure Effects*, 35 J. PERSONALITY & SOC. PSYCH. 191, 191–99 (1977).

Whatever its causes, the mere exposure effect is another reason that our past choices and experiences determine our future preferences. We generally like what is familiar.

4. Dissonance Reduction

Past choices can also influence future preferences because preferences sometimes conform to behavior as a way of reducing cognitive dissonance. To avoid psychological discomfort, people generally strive to maintain consistency among their behavior, opinions, attitudes, and values, so if circumstances cause their behavior to change, then their opinions, attitudes, and values are likely to change as well.[181] Leon Festinger, a pioneer in the study of cognitive dissonance, gives the example of a factory worker who becomes a foreman and suddenly finds himself routinely taking actions, such as giving orders, that are dissonant with his prior opinions and beliefs.[182] To reduce dissonance, he quickly adopts the opinions and values of other foremen and begins to dissociate from the workers who had been his friends.[183]

Dissonance reduction can cause future preferences to align with past choices.[184] In particular, when people choose between similarly valued options, they experience psychological discomfort because selecting one option requires overlooking the appealing aspects of the rejected alternative, as well as the unappealing aspects of the selected alternative.[185] A long line of studies have shown that, after making this type of hard choice, people resolve the dissonance that they experience by rating the selected option as better than they did initially and the rejected option as worse—thereby reinforcing the preference for the selected option.[186] Recent research suggests that these post-choice changes in option ratings have a biological basis and are reflected in

181. *See* Leon Festinger, A Theory of Cognitive Dissonance 260–73 (1957). For a recent review of the literature on cognitive dissonance, see Eddie Harmon-Jones and Judson Mills, *An Introduction to Cognitive Dissonance Theory and an Overview of Current Perspectives on the Theory*, *in* Cognitive Dissonance: Reexamining a Pivotal Theory in Psychology 3, 3–18 (Eddie Harmon-Jones ed., 2d ed. 2019). On the role of dissonance reduction in preference formation, see Bowles, *Endogenous Preferences*, *supra* note 47, at 81.

182. Festinger, *supra* note 181, at 273.

183. *Id.*

184. *E.g.*, Tali Sharot et al., *Is Choice-Induced Preference Change Long Lasting?*, 23 Psych. Sci. 1123, 1126–27 (2012).

185. Festinger, *supra* note 181, at 261.

186. For a review of the literature, see Harmon-Jones and Mills, *supra* note 181, at 3–18. For recent work that confirms the conclusions of earlier studies, while addressing methodological criticisms of those studies, see Tali Sharot et al., *Do Decisions Shape Preference? Evidence from Blind Choice*, 21 Psych. Sci. 1231, 1232–34 (2010).

increased activity in the caudate nucleus, an area of the brain that plays a role in reward expectation and learning.[187]

5. Adaptation

Preferences often adapt to fit the circumstances in which people find themselves. With some notable exceptions, people generally adapt to both positive and negative life changes and a variety of circumstances and opportunity sets—all while maintaining roughly the same level of self-reported well-being.[188] Less attractive people, for instance, place less emphasis on attractiveness and more on other traits, such as sense of humor, in evaluating a romantic partner.[189] They learn to love the one they are with. Even those who have suffered debilitating injuries often find ways to adapt such that their self-reported levels of happiness are not as low as you might expect.[190] Adaptation is yet another reason that past choices and experiences can influence future preferences. Whatever our prior choices, we tend to adapt to the consequences that flow from them and then act consistently going forward.

6. Acquiring New Tastes and Habits

Current choices can also influence future preferences through the acquisition of new tastes. While children have an innate aversion to bitter tastes, people often learn, with experience, to enjoy certain bitter foods and beverages, including vegetables, coffee, and beer.[191] Similarly, if adults reduce their salt intake for two to three months, they come to prefer less salt.[192]

Current choices can also create new habits. A habit exists when cues in the environment trigger an automatic behavioral response.[193]

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187. Tali Sharot et al., *How Choice Reveals and Shapes Expected Hedonic Outcome*, 29 J. Neuroscience 3760, 3764 (2009).

188. For reviews of the evidence on adaptation, see Polly Mitchell, *Adaptive Preferences, Adapted Preferences*, 127 Mind 1003, 1004–09 (2018); Paul Dolan & Daniel Kahneman, *Interpretations of Utility and the Implications for the Valuation of Health*, 118 Econ. J. 215, 217–20 (2008).

189. Leonard Lee et al., *If I'm Not Hot, Are You Hot or Not?: Physical Attractiveness Evaluations and Dating Preferences as a Function of One's Own Attractiveness*, 19 Psych. Sci. 669, 675 (2008).

190. *E.g.*, Dolan & Kahneman, *supra* note 188, at 217–20; Philip Brickman et al., *Lottery Winners and Accident Victims: Is Happiness Relative?*, 36 J. Personality & Soc. Psych. 917, 921 (1978).

191. Mennella & Beauchamp, *supra* note 153, at 206.

192. Mary Bertino et al., *Long-Term Reduction in Dietary Sodium Alters the Taste of Salt*, 36 Am. J. Clinical Nutrition 1134, 1134 (1982).

193. Phillippa Lally et al., *How Are Habits Formed: Modelling Habit Formation in the Real World*, 40 Eur. J. Soc. Psych. 998, 998 (2010); Wendy Wood & David T. Neal, *A New Look at Habits and the Habit-Goal Interface*, 114 Psych. Rev. 843, 843–47

Habits develop gradually as the result of mental associations between a repeated behavior, e.g., buckling a seatbelt, and recurring cues, e.g., getting into a car.[194] Habit development requires consistent repetition of the behavior, perhaps for several months.[195] Once a strong habit forms, however, the habitual behavior occurs automatically, uncontrollably, and without conscious intent whenever the appropriate cues are present.[196]

7. Norm Internalization

In Part II, we saw that social norms are part of the context within which preferences are constructed. As a result, Pigouvian taxes can affect preference construction indirectly through their influence over social norms.

Social norms can also influence the formation of stable, long-term preferences through norm internalization. Norm internalization likely involves many of the mechanisms of preference formation discussed in this section. Initially, a person may not have an internal preference about how to act in a given situation, and a norm provides guidance as part of the preference construction process. Alternatively, the person may have an internal preference to act in a manner counter to a norm but may choose to comply with the norm anyway because doing so confers extrinsic benefits, e.g., reputational gains, or avoids extrinsic costs, e.g., ostracization. In either case, once the person begins to act consistent with the norm, her internal preference may change as a result of self-herding, the mere exposure effect, dissonance reduction, adaptation, or habit formation.[197] In other words, repeated compliance with a social norm may cause it to become internalized.[198] For example, people are

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(2007); Bas Verplanken, *Beyond Frequency: Habit as a Mental Construct*, 45 Brit. J. Soc. Psych. 639, 640–41 (2006).

194. Brian M. Galla & Angela L. Duckworth, *More Than Resisting Temptation: Beneficial Habits Mediate the Relationship Between Self-Control and Positive Life Outcomes*, 109 J. Personality & Soc. Psych. 508, 509 (2015); Lally et al., *supra* note 193, at 998.

195. Lally et al., *supra* note 193, at 1007.

196. *Id.* at 998; Galla & Duckworth, *supra* note 194, at 509.

197. For discussions of the role of norms in shaping preferences, see McAdams & Rasmusen, *supra* note 104, at 1579; Herbert Gintis, *The Genetic Side of Gene-Culture Coevolution: Internalization of Norms and Prosocial Emotions*, 53 J. Econ. Behav. & Org. 57, 60–66 (2004); and Robert Cooter, *Expressive Law and Economics*, 27 J. Legal Stud. 585, 585–96 (1998) [hereinafter Cooter, *Expressive Law*].

198. For a discussion of norm internalization, see generally John F. Scott, Internalization of Norms: A Sociological Theory of Moral Commitment (1971); *see also* Robert Axelrod, *An Evolutionary Approach to Norms*, 80 Am. Pol. Sci. Rev. 1095, 1104 (1986) (describing how families and societies work hard to internalize a variety of norms in children). A related literature argues that preferences

more likely to use public transit and bicycles instead of cars when the prevailing social norm favors doing so,[199] and using alternative forms of transportation likely leads to a preference for them.[200]

Norm internalization powerfully influences behavior because a person who has internalized a norm will often view the normalized behavior as right and appropriate—taking pride and pleasure in complying with the norm or feeling guilt and a loss of self-esteem when failing to comply.[201] This can lead to compliance with the norm even in the absence of extrinsic rewards or penalties.[202]

B. Influencing Preferences by Influencing Choices

Since choices and behavior can produce relatively stable, longer-term preferences through the mechanisms discussed in Section A, Pigouvian taxes can potentially produce stable prosocial preferences by acting indirectly through their influence on choices and behavior. The claim here is not that preferences are completely malleable such that taxes can magically eliminate preferences for all goods and activities that generate harmful externalities. As Itamar Simonson put it, "[A] daptation and mere exposure notwithstanding, there are many things that most people do not adapt to and continue to dislike."[203] Nonetheless, many of the antisocial preferences that we currently take for granted are likely attributable to self-herding, the mere exposure effect, habit formation, norm internalization, and similar processes and likely can be altered as a result of those very same processes.

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are often transmitted from one generation to the next through the operation of culture—specifically through family interactions, religious beliefs and practices, market interactions, and educational institutions. *E.g.*, Ingmar Schumacher, *The Endogenous Formation of an Environmental Culture*, 76 EURO. ECON. REV. 200, 202 (2015); Alberto Bisin, *The Economics of Cultural Transmission and the Dynamics of Preferences*, 97 J. ECON. THEORY 298, 298–301 (2001); Bowles, *Endogenous Preferences*, *supra* note 47, at 75–111.

199. *See* Christine Kormos et al., *The Influence of Descriptive Social Norm Information on Sustainable Transportation Behavior: A Field Experiment*, 47 J. ENV'T & BEHAV. 479, 479 (2015).

200. *See infra* Part III.B.

201. *See, e.g.*, Erik O. Kimbrough & Alexander Vostroknutov, *Norms Make Preferences Social*, 14 J. EURO. ECON. ASS'N 608, 609–10 (2016) (finding that norms influence behavior); Gintis, *supra* note 197, at 63–65; James K. Rilling et al., *A Neural Basis for Social Cooperation*, 35 NEURON 395, 403 (2002).

202. *See* Shalom H. Schwartz, *Normative Explanations of Helping Behavior: A Critique, Proposal, and Empirical Test*, 9 J. EXPERIMENTAL SOC. PSYCH. 349, 353 (1973); Amitai Etzioni, *Social Norms: Internalization, Persuasion, and History*, 35 L. & SOC. REV. 157, 163 (2000); Cooter, *Expressive Law*, *supra* note 197, at 586; Axelrod, *supra* note 198, at 1104.

203. Simonson, *supra* note 64, at 162.

Pigouvian taxes can influence choices and behavior in two ways. The most obvious is by increasing the prices of goods and activities that generate external costs. The second is through their impact on the preference construction process as described in Part II—especially by providing risk-related information, activating certain goals, and increasing the salience of particular norms. Either way, once Pigouvian taxes alter choices and behavior, the mechanisms discussed in section A will often alter future preferences in a way that tends to reinforce those choices.

Real-world experience with one type of Pigouvian tax—congestion pricing—illustrates this process. When a person drives on crowded city roads and streets, she imposes an external cost on other drivers in the form of exacerbating road congestion and slowing their travel time.[204] Economists have long argued that cities should charge tolls to internalize the externality—ideally with prices varying throughout the day depending on traffic volume.[205] In fact, several cities throughout the world have adopted congestion pricing, including Stockholm, Singapore, and London.[206]

In many instances in which congestion pricing has been adopted, it was initially opposed by a majority of the public, but then, after implementation, it became much more popular.[207] In Stockholm, for example, fewer than forty percent of the city's residents supported congestion pricing before the city implemented a pilot program to test it.[208] Shortly after the pilot program, a majority voted in favor of a referendum to retain it, and within a few years, congestion pricing enjoyed overwhelming public support.[209]

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204. Richard Arnott & Kenneth Small, *The Economics of Traffic Congestion*, 82 Am. Sci. 446, 451–52 (1994).

205. *See, e.g.*, *id.*

206. Aya Selmoune et al., *Influencing Factors in Congestion Pricing Acceptability: A Literature Review*, 2020 J. Advanced Transp. 1, 2–4 (2020); Maria Borjesson et al., *The Stockholm Congestion Charges—5 Years on. Effects, Acceptability, and Lessons Learnt*, 20 Transp. Pol'y 1, 1–2 (2012). New York City was supposed to implement congestion pricing this year, but the governor of New York indefinitely paused the plan; supporters of congestion pricing are challenging the governor's action in court. Anna Ley & Winnie Hu, *Legal Fight to Revive Congestion Pricing Can Proceed, Judge Rules*, N.Y. Times (Sept. 27, 2024), https://www.nytimes.com/2024/09/27/nyregion/congestion-pricing-hochul.html [https://perma.cc/HN9D-LP9J].

207. Camila Domonoske, *City Dwellers Don't Like the Idea of Congestion Pricing—But They Get Over It*, NPR (May 7, 2019), https://www.npr.org/2019/05/07/720805841/city-dwellers-dont-like-the-idea-of-congestion-pricing-but-they-get-over-it [https://perma.cc/48TE-7RL7]; *see* Borjesson et al., *supra* note 206, at 7–8; Lena Winslott-Hiselius, *The Development of Public Attitudes Towards the Stockholm Congestion Trial*, 43 Transp. Rsch., Part A 269, 269–76 (2009).

208. Borjesson et al., *supra* note 206, at 7.

209. *Id.* at 7–8.

A number of researchers have investigated why experience with the policy alters the public's view of congestion pricing.[210] Endogenous preferences clearly play a significant role. After congestion pricing is put in place, people find and adjust to alternative modes of transportation, including public transit, biking, and walking, and they discover that reducing the amount that they drive is not as hard as they thought it would be and that, when they do drive, they spend less time stuck in traffic.[211]

Congestion pricing is not unique in this respect. A number of studies have found that support for plastic bag taxes increases after the taxes are adopted—apparently because people quickly and easily adapt to life without plastic bags.[212] They instead bring their own reusable bags to the store or forgo a bag altogether.

The experiences with congestion pricing and plastic bag taxes could likely be replicated with other Pigouvian taxes.[213] For example, a carbon tax or a Pigouvian tax on gasoline would reduce driving and encourage greater use of alternative transportation, including public transit and biking. By reducing driving, these taxes would ultimately alter preferences for driving—again through the mechanisms of self-herding, mere exposure, habit formation, and so forth.

Similarly, a Pigouvian tax on meat consumption would likely discourage preferences for meat, thereby reducing greenhouse gas emissions from the agricultural sector and with the added benefit of improving public health.[214] As we have already seen, substantial evidence suggests that preferences for particular types of food are fairly malleable, especially due to the mere exposure effect, which suggests that the transition to plant-based diets would not be nearly as painful as meat-lovers believe.

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210. *E.g.*, Winslott-Hiselius, *supra* note 207, at 269–81.

211. Selmoune et al., *supra* note 206, at 7–8; Jonas Eliasson, *The Stockholm Congestion Charges: An Overview* 16–22 (Centre for Transport Studies Working Paper 2014:7); Borjesson et al., *supra* note 206, at 3–10; Winslott-Hiselius, *supra* note 207, at 281.

212. *See* Thomas et al., *supra* note 90, at 7–9; Poortinga et al., *supra* note 90, at 243–44; Convery et al., *supra* note 90, at 2.

213. *Cf.* Todd L. Cherry et al., *The Impact of Trial Runs on the Acceptability of Environmental Taxes: Experimental Evidence*, 38 Res. & Energy Econ. 84, 92 (2014) (finding in an experimental setting that when people gain experience with Pigouvian taxes by participating in multiple laboratory trials, support for the taxes increases dramatically).

214. *See* Marco Springmann, *Analysis and Valuation of the Health and Climate Change Cobenefits of Dietary Change*, 113 PNAS 4146, 4146 (2016); Prajal Pradhan, *Embodied Greenhouse Gas Emissions in Diets*, 8 PlosOne e62228, e62228 (2013) (discussing the reduction in greenhouse gas emissions that would result from a reduction in meat consumption).

Moreover, the government can enhance the indirect influence of Pigouvian taxes over people's preferences by combining taxes with other policies that reinforce their effects on behavior. Smoking policy provides a good example. The government has combined cigarette taxes with numerous other policies that also tend to reduce smoking, including indoor-smoking bans, restrictions on advertising, and public education campaigns. By altering people's choices, these laws have reduced preferences for smoking, including through the mechanisms of preference formation discussed in Section A.[215] In particular, social norms with respect to smoking have changed dramatically. In the 1940s, nearly half of American adults smoked.[216] Today, that figure is less than twelve percent, and so many Americans have internalized the anti-smoking norm that smoking-related stigma has become a force in preventing uptake and encouraging quitting.[217] As the smoking example illustrates, ushering in a widespread preference cascade may require multiple forms of government intervention.

An especially promising policy option for encouraging stable, prosocial preferences is to combine taxes with environmentally friendly nudges. Nudges have been shown to encourage environmentally friendly behavior.[218] To illustrate, consider the fact that bad habits concerning energy usage represent a substantial barrier to addressing climate change.[219] Evidence suggests, however, that power companies can interrupt these habits and cheaply reduce electricity usage simply by sending people an electric bill that states whether their power usage is above or below average for their neighborhood and including a smiley face for those who are below average and a frown for those who are not.[220] This type of nudge could reinforce a carbon tax that would

215. *See* David T. Levy, *The Role of Public Policies in Reducing Smoking: The Minnesota Simsmoke Tobacco Policy Model*, 43 Am. J. Prev. Med. S179, S183–85 (2012).

216. Kai-Wen Cheng & Don S. Kenkel, *U.S. Cigarette Demand: 1944-2004*, 10 B.E.J. Econ. Analysis & Pol'y 1, 4 (2010).

217. *See* Centers for Disease Control & Prevention, *Current Cigarette Smoking Among Adults in the United States*, https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm [https://perma.cc/PR4H-WS77]; Jennifer Stuber et al., *Smoking and the Emergence of a Stigmatized Social Status*, 67 Soc. Sci. & Med. 420, 422–29 (2008).

218. *See, e.g.*, Ian Ayres et al., *Evidence from Two Large Field Experiments that Peer Comparison Feedback Can Reduce Residential Energy Usage*, 29 J.L. Econ. & Org. 992, 1015–16 (2013).

219. *See, e.g.*, Bas Verplanken & Lorraine Whitmarsh, *Habit and Climate Change*, 42 Current Op. Behav. Sci. 42, 42 (2021); Harold Wilhite, *The Problem of Habits for a Sustainable Transformation*, *in* Sustainable Consumption and the Good Life 100, 100–08 (Karen L. Syse & Martin L. Mueller eds., 2015).

220. Ayres et al., *supra* note 218, at 1015–16.

raise the price of electricity. The combination of policies would likely alter behavior in ways that tend to conserve electricity, which would ultimately lead to more environmentally friendly preferences related to electricity usage.

IV. How Endogenous Preferences Can Make Pigouvian Taxes More Efficient

Parts II and III described how Pigouvian taxes can shape preferences. This Part argues that endogenous preferences can make Pigouvian taxes more efficient than standard analysis suggests by reducing the economic harm to consumers and workers that at least partially offsets the benefits of Pigouvian taxes for society as a whole. Specifically, Section A argues that, because preferences are endogenous, substitution effects may not be as important as is traditionally assumed. Similarly, section B argues that endogenous preferences potentially reduce the effect of Pigouvian taxes on decisions about how much to work—what economists refer to as "the labor-leisure tradeoff."[221] Finally, section C addresses the special case of internality-generating and addictive goods.

A. Substitution Effects and the Market for Externality-Generating Goods

Standard economic analysis assumes that, while a properly designed Pigouvian tax avoids external costs and produces a net benefit for society, it also imposes an economic burden on consumers that partially offsets this benefit. The economic burden does not result from paying the tax because the private harm to the consumer from paying the tax is offset by the social benefit produced when the government receives tax revenue that allows it to pay for valuable public goods. Instead, the true economic burden of Pigouvian taxes is the loss in consumer utility that occurs when consumers alter their behavior to avoid them. More precisely, Pigouvian taxes distort behavior by causing taxpayers to substitute untaxed activities for taxed ones—a phenomenon known as the "substitution effect."[222]

To illustrate, consider a Pigouvian tax on gas-guzzling SUVs. The tax would likely cause people to buy fewer SUVs and more hybrid cars. In that case, an economist would argue that these consumers are worse off because, in the absence of taxes, they would rather drive an

221. *See* Mankiw, *supra* note 33, at 383 (discussing the labor-leisure tradeoff).
222. Harvey S. Rosen & Ted Gayer, Public Finance 331–38 (McGraw-Hill Co. Inc., 8th ed. 2008).

SUV, whereas the government is no better off because, when people buy hybrids, it receives no tax revenue.[223] To be clear, the social (i.e., environmental) benefits of the gas-guzzler tax may outweigh the loss in consumer utility from the switch to hybrids because the switch to hybrids also avoids some of the external costs of global warming.[224] Nonetheless, standard economics assumes that the loss in consumer utility is real and reduces the benefit of the tax.

The problem with the standard analysis of substitution effects is that it depends critically on the assumption that preferences are fixed and ignores the possibility that they might change in response to taxes. In fact, a gas-guzzler tax might cause people to come to prefer hybrids. This newfound preference might result from the mere exposure effect or dissonance reduction. Alternatively, people might simply adapt to hybrids—realizing that they enhance self-image by reducing a person's carbon footprint. In that case, it becomes less clear that the tax produces a loss in consumer utility through substitution effects.

Moreover, standard analysis assumes that if a person prefers gas-guzzling SUVs, then that preference must be utility-maximizing. As we saw in Part III, however, that is not necessarily the case. The preference for gas-guzzlers could have resulted from path-dependent learning, and the gas-guzzler tax may simply cause people to discover that, in reality, hybrids are better, e.g., because they entail fewer trips to the gas station and lower fuel costs.

More generally, to the extent that preferences change and people adapt, then, arguably, the way that Pigouvian taxes should be evaluated is by focusing on transition costs.[225] Initially, the burden is great as people feel the pain of changing their behavior by substituting untaxed products that they initially dislike, but then the pain subsides as they adapt.[226] In that case, the argument for Pigouvian taxes is even stronger than traditionally assumed. The people whose preferences change because of Pigouvian taxes will actually come to prefer to behave in socially beneficial ways, which reduces the cost of eliminating

223. *See* A. Lans Bovenberg & Lawrence H. Goulder, *Environmental Taxation and Regulation*, *in* 3 HANDBOOK OF PUBLIC ECONOMICS 1471, 1501 (Alan J. Auerbach & Martin Feldstein eds., 2002).

224. *Id.*

225. *Cf.* Gregory S. Crespi, *The Endogeneity Problem in Cost-Benefit Analysis*, 8 GEO. J.L. PUB. POL'Y 91, 100 (2010) ("If there are any transitional preference structures they should be used for valuing those particular policy consequences that occur while those transitional preference structures are in existence.").

226. *Cf.* Sunstein, *Environmental Law*, *supra* note 26, at 240 (arguing that if government incentivizes mass transit, the subjective costs of using it will decrease over time as people become less dependent on cars).

externalities. Moreover, to the extent that some people's preferences do not change, Pigouvian taxes continue to perform their traditional function of internalizing external costs, and they do so more efficiently and effectively than other forms of regulation.[227]

In fact, if Pigouvian taxes shape behavior so that people do not develop socially harmful preferences in the first place, then even transition costs can be avoided.[228] For instance, by making driving more expensive, a carbon tax would place a significant burden on people who are already driving dependent—for example, because they live in the suburbs far from work and are not used to public transit.[229] Over time, they might adapt but the transition costs would still be significant. However, for those who are not already driving dependent when the tax is adopted—including future generations—the tax may prevent them from developing a preference for driving. Instead, they may develop a preference for city life and for public transportation—thereby avoiding transition costs.[230]

This example illustrates how preference shaping can significantly reduce the cost of getting people to act in socially beneficial ways.[231] Once people develop socially harmful preferences, forcing them to act against those preferences harms them and is therefore costly. But if government intervention avoids the socially harmful preferences in the first place, then this cost is avoided as well.

Up to this point, I have discussed welfare effects where preferences change as a result of the mechanisms of stable preference formation discussed in Part III or where initial preferences are not utility-maximizing, but are instead a product of path-dependent learning. What if, instead, a Pigouvian tax influences the preference construction process by conveying risk information, activating a certain goal, or increasing the salience of a social norm?

Returning to the plastic bag tax, the tax appears to alter preferences by activating the goal of environmental protection and making salient a

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227. On the superiority of Pigouvian taxes over other forms of regulation, see the sources cited *supra* Part I.A.

228. *Cf.* Porat, *supra* note 26, at 228–29 (arguing that avoiding socially harmful preferences imposes less of a burden than allowing those preferences to develop and then using regulation to curtail the damage).

229. *See* Sunstein, *Environmental Law*, *supra* note 26, at 229.

230. *See* Rachel Weinberger & Frank Goetzke, *Unpacking Preference: How Previous Experience Affects Auto Ownership in the United States*, 47 URB. STUD. 2111, 2118–25 (2010).

231. *Cf.* Linus Mattauch & Cameron Hepburn, *Climate Policy When Preferences Are Endogenous—and Sometimes They Are*, XL MIDWEST STUD. PHILO. 76, 89 (2016) ("[I]f policy induces stronger preferences for low-carbon consumption goods, the costs of decarbonization fall.").

social norm against plastic bag usage. As a result, the consumer welfare effects of the plastic bag tax are ambiguous. It is possible that the tax works by causing people to feel ashamed of their plastic bag usage,[232] and if so, that shame counts as a psychic cost, and any change in behavior resulting from it should likely count as a loss of consumer utility. On the other hand, the tax could work by focusing attention on an action that will help the environment and by shifting social norms such that avoiding plastic bag usage comes to be viewed as moral and socially valued. In that case, the pride that people feel when they shift away from plastic bags provides a psychic subsidy that should count as a benefit of the tax.[233] A third possibility is that the tax triggers guilt initially, but then as people modify their behavior and begin to internalize the norm against plastic bag usage, the guilt turns to pride. More research is needed on this question, but the limited available evidence suggests that pride and similar emotions play a significant role in motivating pro-environmental behavior.[234]

232. For evidence that pro-environmental behavior is motivated by guilt, see Nicole S. Harth et al., *Guilt, Anger, and Pride about In-Group Environmental Behavior: Different Emotions Predict Distinct Intentions*, 34 J. ENVTL. PSYCH. 18, 25 (2013); Mark A. Ferguson & Nyla R. Branscombe, *Collective Guilt Mediates the Effect of Beliefs About Global Warming on Willingness to Engage in Mitigation Behavior*, 30 J. ENVTL. PSYCH. 135, 139 (2010).

233. People feel pride when their behavior complies with their personal standards of what is right and when they attribute a positive outcome to their own action. *See* Daniel Hart & M. Kyle Matsuba, *The Development of Pride and Moral Life*, *in* THE SELF-CONSCIOUS EMOTIONS: THEORY AND RESEARCH 114, 117–19 (Jessica L. Tracey et al., eds., 2007); Bernard Weiner, *An Attributional Theory of Achievement Motivation and Emotion*, 92 PSYCH. REV. 548, 561–62 (1985). A number of scholars have recognized that pride and positive emotions from complying with social norms can provide a psychic subsidy for prosocial behavior. *See* Mattauch et al., *supra* note 57, at 3 (arguing that if preferences change in a way that increases appreciation for environmentally friendly goods, then that may increase utility from a positive self-image); Etzioni, *supra* note 202, at 163 ("If norms shape people's preferences, they will tend to abide by these norms because such adherence is a source of intrinsic affirmation."); Cooter, *Good Citizens*, *supra* note 85, at 1581–84 (arguing that the internalization of a norm causes people to value the norm such that they are willing to incur costs to comply with it); Sunstein, *Social Norms*, *supra* note 101, at 910 (arguing that social norms operate as "subsidies" that encourage socially beneficial behavior when compliance with the norms produces positive effects on reputation and self-conception).

234. *See* Megan J. Bissing-Olson et al., *Experiences of Pride, Not Guilt, Predict Pro-Environmental Behavior When Pro-Environmental Descriptive Norms Are More Positive*, 45 J. ENVTL. PSYCH. 145, 150–51 (2016); Marleen C. Onwezen et al., *The Norm Activation Model: An Exploration of the Functions of Anticipated Pride and Guilt in Pro-Environmental Behaviour*, 39 J. ECON. PSYCH. 141, 150–51 (2013); Harth et al., *supra* note 232, at 24-26; Christer Berglund, *The Assessment of Households' Recycling Costs: The Role of Personal Motives*, 56 ECOLOGICAL ECON. 560, 563–69 (2009); Bente Halvorsen, *Effects of Norms and Opportunity Cost of Time on Household Recycling*, 84 LAND ECON. 501, 511–12 (2008).

B. The Labor-Leisure Tradeoff

According to standard economic analysis, by increasing the prices of goods and services, Pigouvian taxes reduce the real return to labor.[235] In other words, they make the products that we buy more expensive, which means that our paychecks do not buy as much. As a result, Pigouvian taxes, especially a carbon tax that would broadly impact the prices of most goods and services, might cause people to substitute leisure for labor.[236] Economists assume that any tax-induced substitution of leisure for labor reduces welfare because, in the absence of the tax, people would prefer to work more.[237]

This analysis, however, does not incorporate endogenous preferences. If a carbon tax causes preferences to change so that, after people adapt to a less carbon-intensive lifestyle, their overall utility remains unchanged or is enhanced, then it is not clear that they will view the real return to their labor as having decreased.[238] In fact, it may have increased. This is especially true over the long run as the behavioral changes resulting from the tax naturally produce different preferences than would have otherwise materialized.

C. Internality-Generating and Addictive Goods

The takeaway from sections A and B is that preference change has the potential to reduce the loss in consumer utility resulting from Pigouvian taxes. This conclusion applies with even more force where the taxed good generates internalities, especially if it is addictive.

We have seen that standard economic analysis assumes that people rationally maximize their own utility. Evidence from psychology and behavioral economics, however, suggests that people suffer from self-control problems as well as cognitive limitations and biases, and, as a result, they may make mistakes that reduce their utility.[239] In some cases,

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235. Bovenberg & Goulder, *supra* note 223, at 1501; Ian W.H. Parry & Wallace E. Oates, *Policy Analysis in the Presence of Distorting Taxes*, 19 J. Pol'y Analysis & Mgmt. 603, 605 (2000).

236. Parry & Oates, *supra* note 235, at 605–06.

237. *See* Bovenberg & Goulder, *supra* note 223, at 1501; Parry & Oates, *supra* note 235, at 605–06.

238. *Cf.* Brian Galle, *Tax, Command…or Nudge?: Evaluating the New Regulation*, 92 Tex. L. Rev. 836, 867–68 (2014) (arguing that nudges may modify behavior without distorting decisions about labor supply because the nudges work subconsciously and consumers may not anticipate that their behavior will change).

239. *E.g.*, Cass R. Sunstein & Richard H. Thaler, *Libertarian Paternalism Is Not an Oxymoron*, 70 U. Chi. L. Rev. 1159, 1159–70 (2003); Colin Camerer et al., *Regulation for Conservatives: Behavioral Economics and the Case for "Asymmetric Paternalism"*, 151 U. Pa. L. Rev. 1211, 1211–19 (2003); Jonathan Gruber & Botond Koszegi,

these mistakes involve consuming goods or engaging in activities that generate an "internality," which is a harm that occurs because a person ignores or gives too little weight to a consequence of her behavior to herself.[240]

Soda and other unhealthy foods illustrate the point. Nearly three out of four adults in the United States are overweight or obese.[241] Overweight and obesity impose external costs via government-financed healthcare and private insurance that is not risk-rated for obesity.[242] In addition, every year many adults try to reduce their weight by changing their diet.[243] The standard economic approach assumes that if a healthy diet is utility maximizing, then people will stick to it. In reality, however, attempts to eat and drink healthier often fail.[244] People plan to give up soda and unhealthy foods, but then they lack the self-control needed to resist temptation and follow through with the plan.[245] In this way, self-control problems produce harmful internalities.

Recognizing that soda in particular generates both externalities and internalities, many cities have adopted or considered soda taxes.[246] The idea behind them is that they may provide the impetus needed to overcome self-control problems and to reduce or avoid soda consumption. If they have this effect, then soda taxes are also likely to alter people's preferences—hopefully pushing them in a healthier direction.

As we have seen, standard economic theory suggests that if a soda tax causes a shift away from soda consumption, then it harms consumers.

Is Addiction "Rational"? Theory and Evidence, 116 Q.J. Econ. 1261, 1285–86 (2001).

240. *See* Jonathan Gruber, *Tobacco at the Crossroads: The Past and Future of Smoking Regulation in the United States*, 15 J. Econ. Persp. 193, 206–09 (2001); R.J. Herrnstein et al., *Utility Maximization and Melioration: Internalities in Individual Choice*, 6 J. Behav. Decision Making 149, 149–50 (1993).

241. *Obesity and Overweight*, Nat'l Center for Health Stat., CDC, https://www.cdc.gov/nchs/fastats/obesity-overweight.html [https://perma.cc/56T8-4YQW].

242. *E.g.*, John Cawley, *An Economy of Scales: A Selective Review of Obesity's Economic Causes, Consequences, and Solutions*, 43 J. Health Econ. 244, 255–56 (2015); Adela Hruby & Frank B. Hu, *The Epidemiology of Obesity: A Big Picture*, 33 Pharmacoecon. 673, 684–88 (2015); John Cawley & Chad Meyerhoefer, *The Medical Care Costs of Obesity: An Instrumental Variables Approach*, 31 J. Health Econ. 219, 227–29 (2012).

243. Andrew J. Hill, *Prevalence and Demographics of Dieting*, *in* Eating Disorders and Obesity: A Comprehensive Handbook 81, 80–83 (Christopher G. Fairburn & Kelly D. Brownell eds., 2d ed. 2002).

244. Michael R. Lowe, *Self-Regulation of Energy Intake in the Prevention and Treatment of Obesity: Is It Feasible?*, 11 Obesity Rsch. 44S, 49S (2003).

245. C. Peter Herman & Janet Polivy, *Self-Regulation and the Obesity Epidemic*, 5 Soc. Issues & Pol'y Rev. 37, 41–65 (2011).

246. *See* Allcott et al., *supra* note 19, at 202-03.

By assuming rational utility maximization, however, standard analysis ignores the possibility of internalities and preference change. If soda consumption generates an internality, then a soda tax that eliminates the preference for soda will in fact increase consumer utility in addition to reducing external costs.

Moreover, we have also seen that standard analysis concludes that taxes like the soda tax produce harmful distortions by reducing the real return to labor. Again, this conclusion ignores the possibility of internalities and preference change. To the extent that a soda tax avoids an internality by altering preferences, then it is not clear that the tax will in fact reduce the real return to labor.[247] In fact, the tax may have the opposite effect. The person no longer wastes money on a harmful soda habit that she wanted to give up anyway. In other words, prior to the tax, the soda habit impeded the person's ability to convert income to utility.[248] By correcting this problem, the tax effectively increases the value of money, which should increase labor supply.[249]

Harmful addictive goods are an extreme example of internality-generating goods. Modern neuroscientific research suggests that addiction can often be characterized as a disease of the brain.[250] In susceptible individuals, repeated use of an addictive substance alters brain chemistry and function in such a way that cues associated with the addiction trigger compulsive use of the drug and exercising restraint or permanently quitting the substance becomes incredibly difficult, even for a person who desperately wants to stop.[251]

Take smoking for example. The majority of adult smokers picked up the habit when they were children, and the evidence suggests that many children smoke, not because doing so is utility maximizing, but because they underestimate the risk of addiction.[252] As a result, about ninety percent of smokers regret smoking, and about eighty percent want

247. *Cf.* Brian Galle, *The Problem of Intrapersonal Cost*, 18 YALE J. OF HEALTH POL'Y L. & ETHICS 1, 36–37 (2018) (arguing that a soda tax that reduces soda consumption of an inattentive consumer is unlikely to affect her labor supply because, given that she is inattentive, she is not likely to notice the reduction in consumption).

248. Brian Galle makes a similar point, though he does not emphasize that the internality sufferer has trouble converting income into utility, but instead argues that the tax "improve[es] the way in which she has chosen to allocate her spending." *Id.* at 39.

249. On the other hand, the tax effectively makes her richer, which should have the opposite effect on labor supply.

250. Kent C. Berridge, *Is Addiction a Brain Disease?*, 10 NEUROETHICS 29, 30 (2017).

251. *Id.* at 31–32.

252. Fatma Ali et al., *Onset of Regular Smoking Before Age 21 and Subsequent Nicotine Dependence and Cessation Behavior Among US Adult Smokers*, 17 PREVENTING CHRONIC DISEASE E06, E06–08 (2020); Gruber, *Smoking Policy*, *supra* note 12, at 121.

to quit.[253] Over forty percent actually attempt to quit each year, but only about four percent to seven percent of those quit attempts succeed.[254] In other words, smoking and similar addictions represent an extreme form of willpower failure, and they often generate both externalities and internalities.

As with internality-generating goods generally, Pigouvian taxes could improve welfare by shaping preferences with respect to addictive goods. In particular, Pigouvian taxes could potentially avoid the development of a preference for addictive goods altogether. Since most people start smoking in their youth and because children respond to cigarette price increases,[255] cigarette taxes deter many children from developing a preference for cigarettes. Moreover, the evidence suggests that a person who would have smoked absent cigarette taxes will instead find a consumption bundle without cigarettes to confer even greater utility.[256]

V. A Broader Scope for Pigouvian Taxes

Part IV argued that endogenous preferences make Pigouvian taxes even more attractive than conventional wisdom suggests by casting doubt on whether those taxes harm consumers as standard economic theory assumes. This Part argues that endogenous preferences can cause externality-generating behavioral contagion, which broadens the potential scope of Pigouvian taxes beyond what traditional reasoning implies.

253. Simon Chapman, Smoke Signals: Selected Writings 275, 314 (2016); Geoffrey T. Fong et al., *The Near-Universal Experience of Regret Among Smokers in Four Countries: Findings from the International Tobacco Control Policy Evaluation Survey*, 6 Nicotine & Tobacco Rsch. 341, 341 (2004).

254. U.S. Dep't of Health & Hum. Servs., Treating Tobacco Use Dependence: 2008 Update 15 (2008).

255. Anindya Sen et al., *Do Changes in Cigarette Taxes Impact Youth Smoking? Evidence from Canadian Provinces*, 13 F. for Health Econ. & Pol'y 1, 2–4 (2010); Christopher Carpenter & Philip Cook, *Cigarette Taxes and Youth Smoking: New Evidence from National, State, and Local Youth Risk Behavior Surveys*, 27 J. Health Econ. 287, 287–91 (2008); Philip DeCicca et al., *Putting Out the Fires: Will Higher Taxes Reduce the Onset of Youth Smoking?*, 110 J. Pol. Econ. 144, 145 (2002).

256. *See* David M. Cutler et al., *Economic Approaches to Estimating Benefits of Regulations Affecting Addictive Goods*, 50 Am. J. Preventive Med. S20, S22 (2016); Lion Shahab & Robert West, *Differences in Happiness Between Smokers, Ex-Smokers, and Never Smokers: Cross-Sectional Findings from a National Household Survey*, 121 Drug & Alcohol Dependence 38, 40–43 (2012) (reporting survey results showing that smokers who have quit for over a year are happier than current smokers and those who have quit for less than a year and are about as happy as never smokers); Jonathan H. Gruber & Sendhil Mullainathan, *Do Cigarette Taxes Make Smokers Happier*, 5 Advances Econ. Analysis & Pol'y 1, 2 (2005) (finding that cigarette taxes increase self-reported happiness among potential smokers).

A. Endogenous Preferences and Behavioral Contagion Generally

Behavioral contagion, also referred to as social contagion or peer effects, is the notion "that sociocultural phenomena can spread through, and leap between, populations more like outbreaks of measles or chicken pox than through a process of rational choice."[257] One of the key findings of social psychology is that we are heavily influenced by the behavior of other people and that we tend to underestimate this fact.[258] Behavioral contagion occurs when one person's behavior increases the likelihood that another person will engage in that same behavior.

Behavioral contagion likely has multiple causes, but endogenous preferences undoubtedly play a role.[259] More specifically, experimental evidence suggests that people sometimes change their preferences to conform with the preferences of others—perhaps because the lack of conformity creates uncertainty about whether their own preferences are appropriate.[260] Moreover, this social influence on preferences appears to be deeply rooted and has a neurobiological basis.[261]

In addition, the behavior of certain people may create a social norm with which others then comply. Evidence suggests, for example, that car choice is subject to peer effects.[262] Whether you prefer to drive a hybrid car or a gas-guzzling SUV depends in part on what those around you happen to drive. Moreover, as we saw in Part III, once people begin to comply with a social norm, the mechanisms of preference formation tend to produce preferences that reinforce that norm. If you buy a

257. Paul Marsden, *Memetics and Social Contagion: Two Sides of the Same Coin?*, 2 J. MEMETICS–EVOLUTIONARY MODELS INFO. TRANSMISSION 171, 171–72 (1998).

258. *E.g.*, Jessica M. Nolan et al., *Normative Social Influence Is Underdetected*, 34 PERSONALITY & SOC. PSYCH. BULL. 913, 921–22 (2008).

259. *See* Porat, *supra* note 26, at 227–28 (explaining how some harmful preferences are "infectious"); Nicholas A Christakis & James H. Fowler, *The Spread of Obesity in a Large Social Network over 32 Years*, 357 NEW ENG. J. MED. 370, 371 (2007) (discussing the possible reasons for peer effects with respect to obesity); Charles F. Manski, *Economic Analysis of Social Interactions*, 14 J. ECON. PERSP. 115, 118–20 (2000).

260. Fatas et al., *supra* note 49, at 73–80.

261. Malia F. Mason et al., *Neural Mechanisms of Social Influence*, 110 ORG. BEHAV. & HUM. DECISION PROCESSES 152, 156–57 (2009).

262. *See* Sridhar Narayanan & Harikesh S. Nair, *Estimating Causal Installed-Base Effects: A Bias-Correction Approach*, 50 J. MKTG. RSCH. 70, 70–74 (2013); Mark Grinblatt et al., *Social Influence and Consumption: Evidence from the Automobile Purchases of Neighbors*, 90 REV. ECON. & STAT. 735, 750–52 (2008). Empirical studies of social contagion and peer effects are challenging because of the possibility of omitted variable bias and selection effects. *See generally* Charles F. Manski, *Identification of Endogenous Social Effects: The Reflection Problem,* 60 REV. ECON. STUD. 531, 532 (1993). The studies that I cite in this Part employ a variety of strategies and techniques to address these problems.

hybrid car because your friends and family do the same,[263] you will likely develop a more or less stable preference for hybrid cars due to the mere exposure effect, dissonance reduction, adaptation, and so on.

Behavioral contagion is important for public policy because it dramatically expands the potential scope for externality regulation, including Pigouvian taxes. As I noted in Part I, the conventional assumption that preferences are fixed includes a corollary assumption that people's preferences are not interdependent. In other words, your preferences do not depend on mine and vice versa. This means that although standard analysis recognizes that my driving a gas-guzzling SUV potentially justifies a Pigouvian tax by directly contributing to the global warming externality, it ignores the fact that my driving an SUV also indirectly contributes to global warming by increasing the probability that my family, friends, and neighbors will also drive an SUV. This indirect external cost magnifies the harm from my behavior, thereby increasing the justification for government intervention, including through Pigouvian taxes.[264]

Researchers have found evidence of social contagion with respect to a variety of goods and activities that generate externalities. There is evidence, for example, of peer effects in whether a homeowner has a traditional lawn or desert landscape—an issue of importance in areas plagued by water scarcity.[265] Similarly, obesity is likely socially contagious.[266]

Alcohol use provides another important example. Drinking generates external costs. In 2022, the U.S. experienced over 13,000 drunk-driving fatalities.[267] More than 140,000 Americans die from

263. *See* Mason et al., *supra* note 261, at 157–58 (discussing the neural mechanisms of social influence).

264. *Cf.* ROBERT H. FRANK, UNDER THE INFLUENCE: PUTTING PEER PRESSURE TO WORK 192 (2020) ("By far the greatest benefit of cigarette taxes and smoking prohibitions has been their contribution to the creation of social environments that make our children less likely to become smokers.").

265. Christa Brelsford & Caterina De Bacco, *Are 'Water Smart Landscapes' Contagious? An Epidemic Approach on Networks to Study Peer Effects*, 18 NETWORKS & SPATIAL ECON. 577, 578, 604 (2018).

266. Ashlesha Datar & Nancy Nicosia, *Assessing Social Contagion in Body Mass Index, Overweight, and Obesity Using a Natural Experiment*, 172 JAMA PEDIATRICS 239, 244–45 (2018); Scott E. Carrell et al., *Is Poor Fitness Contagious? Evidence from Randomly Assigned Friends*, 95 J. PUB. ECON. 657, 660–62 (2011); Nicholas A. Christakis & James H. Fowler, *The Spread of Obesity in a Large Social Network over 32 Years*, 357 NEW ENG. J. MED. 370, 375–77 (2007).

267. NAT'L INST. ON ALCOHOL ABUSE & ALCOHOLISM, *Alcohol-Related Emergencies and Deaths in the United States*, https://www.niaaa.nih.gov/alcohols-effects-health/alcohol-topics/alcohol-facts-and-statistics/alcohol-related-emergencies-and-deaths-united-states [https://perma.cc/5SDU-W7N6].

alcohol related injuries and illnesses each year.[268] Over ten percent of children live with a parent who has an alcohol problem, and having an alcoholic parent leads to a variety of social and behavioral problems.[269] Moreover, drinking is contagious.[270] As a result, even when a person's alcohol use does not directly lead to an external cost—e.g., because that person does not drink and drive—it may do so indirectly by encouraging others to drink. In this way, behavioral contagion increases the scope for a Pigouvian tax on alcohol.

B. Exacerbation by Internalities

Behavioral contagion is particularly harmful in the presence of internalities. Internalities can significantly increase the indirect external cost of harmful, socially contagious behavior. Take smoking for example. Some economists have famously argued that the external costs of smoking are surprisingly low, such that large Pigouvian taxes on cigarettes are not justified.[271] These economists concede that smoking generates externalities as a result of second-hand smoke and the fact that taxpayers have to pay the smoking-related healthcare costs of some smokers. They point out, however, that many smokers die early, which saves a significant amount of money for the Medicare and Social Security programs.[272] As a result, "there is a fairly strong consensus [among economists] that the net externalities are small, on the order of forty cents per pack or less."[273]

This consensus, however, ignores what is arguably the single-biggest externality of smoking, which is the fact that one person's decision to smoke substantially increases the likelihood that others

268. *Id.*

269. Rachel N. Lipari & Struther L. Van Horn, *Children Living with Parents Who Have a Substance Use Disorder*, Substance Abuse and Mental Health Services Administration (Aug. 24, 2017), https://www.samhsa.gov/data/sites/default/files/report_3223/ShortReport-3223.html [https://perma.cc/QS5L-4Q2Y].

270. *See* Mir M. Ali & Debra S. Dwyer, *Social Network Effects in Alcohol Consumption Among Adolescents*, 35 Addictive Behav. 337, 340 (2010); Michael Kremer & Dan Levy, *Peer Effects and Alcohol Use Among College Students*, 22 J. Econ. Perspectives 189, 199–202 (2008); Andrew E. Clark & Youenn Lohéac, "*It Wasn't Me, It Was Them!" Social Influence in Risky Behavior by Adolescents*, 26 J. Health Econ. 763, 781 (2007); Petter Lundborg, *Having the Wrong Friends? Peer Effects in Adolescent Substance Use*, 25 J. Health Econ. 214, 229 (2006).

271. *See* W. Kip Viscusi, Smoke-Filled Rooms: A Postmortem on the Tobacco Deal 73 (2002); Willard G. Manning et al., *The Taxes of Sin: Do Smokers and Drinkers Pay Their Way?*, 261 J. Am. Med. Ass'n 1604, 1604–09 (1989); Willard G. Manning et al., The Costs of Poor Health Habits 62–85 (1991).

272. Viscusi, *supra* note 271, at 67–68, 73–76.

273. Gruber, *Smoking Policy*, *supra* note 12, at 120.

will develop a harmful preference for smoking.[274] As I have already noted, most people start smoking when they are children, and they underestimate the risk of addiction. Then, as addicted adult smokers, they express regret and attempt to quit, but find it difficult to do so. It is very likely then, that for many smokers, smoking is a mistake in the sense that the harm from smoking significantly outweighs any benefit. Given that and the fact that smoking is socially contagious, the indirect external cost of one person's decision to smoke includes the harm that results to others who smoke because of peer effects.[275] Because smoking kills over 400,000 Americans each year and causes significant health problems for many others,[276] this indirect external cost is likely very large, potentially justifying a substantial Pigouvian tax.

SUVs provide another example. We have seen that there is evidence that some people irrationally ignore the long-term savings from more fuel-efficient cars, and that, absent that error, more people would prefer hybrids to gas-guzzling SUVs. In other words, they buy gas guzzlers instead of hybrids because they suffer from an internality. We have also seen that peer effects influence the decision whether to buy a gas-guzzler or a hybrid. As a result, those who buy a gas-guzzler impose an indirect external cost by increasing the probability that others will buy one as well and that the decision to do so will be an irrational mistake. Again, this indirect external cost broadens the potential scope for Pigouvian taxes.

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274. FRANK, *supra* note 264, at 114–18; Mir. M. Ali & Debra S. Dwyer, *Estimating Peer Effects in Adolescent Smoking Behavior: A Longitudinal Analysis*, 45 J. ADOLESCENT HEALTH 402, 402 (2009). Also consistent with the notion that smoking is contagious, smoking by parents is associated with smoking by children and smoking among spouses is strongly correlated—though causation is difficult to prove in the family setting. Denise B. Kandel et al., *Intergenerational Patterns of Smoking and Nicotine Dependence Among US Adolescents*, 105 AM. J. PUB. HEALTH e63, e65 (2015); Laura K. Cobb et al., *The Association of Spousal Smoking Status with the Ability to Quit Smoking: The Atherosclerosis Risk in Communities Study*, 179 AM. J. EPIDEMIOLOGY 1182, 1182–85 (2014); Karl G. Hill et al., *Family Influences on the Risk of Daily Smoking Initiation*, 37 J. ADOLESCENT HEALTH 202, 207 (2005); Gregory G. Homish & Kenneth E. Leonard et al., *Spousal Influence on Smoking Behaviors in a US Community Sample of Newly Married Couples*, 61 SOC. SCI. & MED. 2557, 2557 (2005).

275. *Cf.* CONGDON ET AL., *supra* note 47, at 112 (arguing that smoking and eating junk food around a person who lacks willpower can produce an externality by causing that person to suffer a failure of self-control).

276. CENTERS FOR DISEASE CONTROL & PREVENTION, *Diseases and Death*, https://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/diseases-and-death.html [https://perma.cc/4ZTL-RMST].

VI. Endogenous Preferences and The Social Multiplier Effect

We have seen that behavioral contagion can indirectly create or exacerbate externalities, thereby increasing the potential scope for Pigouvian taxes. The flip side of the coin is that behavioral contagion can also enhance the impact of Pigouvian taxes by generating a social multiplier effect that standard economic analysis ignores.[277] More specifically, if a Pigouvian tax discourages socially harmful behavior or if it encourages socially beneficial behavior, and if preferences for those behaviors are infectious, then the infectious nature of preferences will augment the tax's effectiveness.

This social multiplier effect is potentially of special importance for a carbon tax. We have seen that one of the mechanisms responsible for behavioral contagion is social norms. The ability of Pigouvian taxes to indirectly influence preferences by altering social norms is of particular importance for environmental protection. Evidence suggests that social norms are important for encouraging environmentally friendly behavior such as energy conservation.[278] A carbon tax would affect purchasing decisions related to carbon-intensive goods not just by directly increasing their prices. It would also do so indirectly by altering social norms, generating peer effects, and ultimately modifying preferences.

For example, there is evidence that the adoption of solar panels by homeowners is contagious such that a person's probability of installing solar panels on his roof increases as the number of his neighbors who have solar panels increases.[279] Similarly, peer effects exist with respect to obtaining green building certificates.[280] Phenomena like these will magnify the behavior and preference change brought about by a carbon tax. If, by increasing energy prices, a carbon tax causes some people to

277. *See* Frank, *supra* note 264, at 200 ("[B]ecause behavioral contagion amplifies people's tendency to make energy-intensive choices, the adoption of a carbon dioxide tax not only would reduce energy-intensive activities by making them more expensive, but would also generate powerful social feedback effects."); Andrew E. Clark, *"It Wasn't Me, It Was Them!" Social Influence in Risky Behavior by Adolescents*, 26 J. Health Econ. 763, 781 (2007) (arguing that "any policy impact on consumption [of alcohol by adolescents]…will be amplified through peer group effects" and "[w]hat may have looked like an initially small effect of government policy on (say) drinking will grow over time as adolescents copy each other.").

278. Susanne Gockeritz et al., *Descriptive Normative Beliefs and Conservation Behavior: The Moderating Roles of Personal Involvement and Injunctive Normative Beliefs*, 40 Euro. J. Soc. Psych. 514, 518–20 (2010); Nolan et al., *supra* note 258, at 920–21.

279. *See* sources cited *supra* note 30.

280. Yueming Qiu et al., *Peer Effects and Voluntary Green Building Certification*, 8 Sustainability 632, 640–43 (2016).

adopt solar panels and some builders to adopt green building practices, that will, through behavioral contagion, trigger adoption of solar panels and green building practices by others.

Standard analysis ignores the possibility of behavioral contagion, which should make it possible to achieve a target level of carbon emissions reduction using a smaller tax.[281] In fact, one estimate suggests that the social multiplier effect could allow governments to achieve a given emissions reduction target, such as that established by the 2015 Paris agreement, with at tax that is nearly forty percent less than the tax that would otherwise be required.[282]

Another potentially large benefit of the social multiplier effect is that it could substantially reduce the labor-leisure distortions caused by a carbon tax. As discussed in Part IV.B, a carbon tax would potentially reduce the incentive to work because it would raise the price of carbon-intensive goods, thereby reducing real wages. Moreover, the potential magnitude of this tax distortion increases as the carbon tax rate increases.[283] As a result, the social multiplier effect should reduce labor-leisure distortions by reducing the carbon tax rate needed to achieve the carbon reduction target.

VII. Potential Objections and A Framework for Policymakers

Up to this point, I have made the case that using Pigouvian taxes to shape preferences has a number of potential benefits. Parts II and III argued that Pigouvian taxes can shape preferences in a way that reduces harmful externalities. By altering preferences, even small Pigouvian taxes like the plastic bag taxes discussed in Part II can have dramatic effects. Part IV argued that preference changes potentially make Pigouvian taxes more efficient by reducing the welfare losses resulting from substitution effects and labor-leisure distortions. Part VI argued that the combination of preference change and behavioral contagion can generate a beneficial social multiplier effect that amplifies the impact of a Pigouvian tax.

In this Part, I address possible objections to using Pigouvian taxes to shape preferences and argue that, while policymakers should exercise caution, preference shaping should not necessarily be off limits. I

281. *Cf.* McAdams & Rasmusen, *supra* note 104, at 1589 ("[C]hanging a law might have a greater effect if legal sanctions work not just directly, by raising the price of a behavior, but indirectly, by changing norms.").

282. Theo Konc et al., *The Social Multiplier of Environmental Policy: Application to Carbon Taxation*, 105 J. Envtl. Econ. & Mgmt. 102396, 102407 (2021).

283. *See* Rosen & Gayer, *supra* note 222, at 339–40.

also sketch out the beginnings of a framework to help policymakers determine when it is appropriate to use Pigouvian taxes for preference-shaping purposes.

A. Per Se Objections Are Not Compelling

This section addresses possible objections to preference shaping and argues that, while policymakers should exercise caution in shaping preferences, preference shaping should not necessarily be off limits.

1. Preference Shaping Infringes Liberty

The first objection to using Pigouvian taxes to shape preferences is based on the doctrine of consumer sovereignty, which rests on the notion that people's preferences are worthy of respect, and policymakers cause harm if they impede preference satisfaction. Many economists accept this position, and they view any attempt by the government to shape preferences as an assault on liberty and as unwarranted paternalism—an attempt by elite policymakers to substitute their values and preferences for those of the masses whom they govern.[284]

I find this argument unconvincing for four reasons. First, the preference shaping that I advocate is not inherently paternalistic, but is instead motivated by the fact that some preferences harm others. Harm to others is widely viewed as an acceptable rationale for government intervention, and once we agree that the government should intervene, it is not clear why preference shaping should be off limits per se. In fact, as we have seen, preference shaping can be an effective and efficient way to reduce behaviors that generate external costs, but to do so without harming the people who would have otherwise engaged in those behaviors. This is especially likely where government intervention avoids the development of socially harmful preferences in the first instance.

Second, preference shaping is an inevitable result of both government action and inaction.[285] By influencing the decision to try smoking, for example, a cigarette tax will shape preferences for cigarettes, whether intentionally or not. On the other hand, for many years, government restrictions on cigarette advertising were remarkably lax, and cigarette advertisements likely caused many children to develop

284. *E.g.*, JOSEPH E. STIGLITZ, ECONOMICS OF THE PUBLIC SECTOR 59, 740 (3d. ed. 2000) (providing a textbook description of consumer sovereignty and discussing its role in welfare economics); Joel Waldfogel, *Does Consumer Irrationality Trump Consumer Sovereignty?*, 87 REV. ECON. & STAT. 691, 691–92 (2005) (defending consumer sovereignty); Abba P. Lerner, *The Economics and Politics of Consumer Sovereignty*, 62 AM. ECON. REV. 258, 258–66 (1972) (same).

285. *See* Sunstein, *Environmental Law*, *supra* note 26, at 229.

a preference for smoking—a preference that in some cases ultimately led to premature death.[286] By failing to ban cigarette advertising, the government effectively guaranteed the right of cigarette companies to engage in it. In other words, the parents of children who started smoking because of the advertisements could not fight back by, for example, defacing billboards depicting the Marlboro Man; the police would have put those parents in jail because the cigarette companies had a right to advertise that was backed by law.[287] Given that the government inevitably plays a role in shaping preferences—whether through action or inaction—it is not clear why policymakers should not do so consciously and in a way that promotes social goals.

Third, economists often assume, usually implicitly, that preferences are worthy of respect because they are somehow inherent or immutable and depend only on the intrinsic properties of the good in question and of the state of the individual consuming it.[288] This is not always the case, however. As we have seen, preferences are often constructed in the moment of choice and are heavily dependent on contextual factors, many of which may not bear upon utility.[289] In other

286. For a comprehensive review of the empirical evidence that cigarette advertising causes youth smoking, see U.S. DEP'T OF HEALTH & HUM. SERVS., PREVENTING TOBACCO USE AMONG YOUTH AND YOUNG ADULTS: A REPORT OF THE SURGEON GENERAL 508–22 (2012).

287. *See* Mark Platte, *Crusading 'Billboard Bandit' Convicted of Vandalism: Activism: Jury Finds Him Guilty of Defacing Cigarette Ads in a One-Man Campaign Against Smoking*, L.A. TIMES (Sept. 25, 1991), https://www.latimes.com/archives/la-xpm-1991-09-25-me-2586-story.html [https://perma.cc/GNG6-E6ZM]; *cf.* Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1091, 1100–01 (1972) ("When a loss is left where it falls in an auto accident, it is not because God so ordained it. Rather, it is because the state has granted the injurer an entitlement to be free of liability and will intervene to prevent the victim's friends, if they are stronger, from taking compensation from the injurer . . . . [A]n entitlement to a good or to its converse is essentially inevitable. We either are entitled to have silence or entitled to make noise in a given set of circumstances. We either have the right to our own property or body or the right to share others' property or bodies. We may buy or sell ourselves into the opposite position, but we must start somewhere.").

288. *See* Hilke Plassman et al., *Marketing Actions Can Modulate Neural Representations of Experienced Pleasantness*, 105 PROCS. NAT'L ACAD. SCIS. 1050, 1050–52 (2008) (discussing and providing evidence against the "basic assumption in economics . . . . that the experienced pleasantness . . . . from consuming a good depends only on its intrinsic properties and on the state of the individual"); Ariely & Norton, *supra* note 164, at 15 (same).

289. *See supra* Part II; Sunstein, *Constructing Preferences*, *supra* note 26, at 2639 ("If preferences do not predate situations of choice, and emerge in different forms depending on procedure, description, and context, it becomes harder to fathom what it even means to 'override' a 'preference'."); Slovic, *supra* note 62, at 365 ("Without stability across equivalent descriptions and equivalent elicitation procedures, one's preferences cannot be represented as maximization of utility.").

instances, preferences are not necessarily uniquely utility-maximizing, but instead result from path-dependent learning, self-herding, mere exposure, and similar processes.[290] We have also seen that socially harmful preferences often spread through behavioral contagion, and that people frequently do not realize that their preferences are subject to social influences.[291] Finally, people may have preferences, such as eating healthier or quitting smoking, that they are unable to realize due to a lack of willpower and other failures of rationality.[292]

Finally, behavioral contagion sometimes blurs the line between externality regulation and paternalism. For example, I argued in Part V that because smoking is socially contagious and on net harmful to many of those who do it, the external cost of one person's decision to smoke includes the harm to those whose smoking she causes. This means that the smoking externality is much larger than economists recognize. As a result, while smoking likely does generate a substantial internality that might warrant paternalistic intervention, an attempt by the government to create preferences against smoking can also be justified on externality grounds without the need to resort to paternalism.

None of this is to say that the government should ignore all preferences or take preference shaping lightly. If, however, socially harmful preferences are not consciously learned or chosen and are not uniquely utility-maximizing for the people who hold them, but instead result from behavioral contagion, arbitrary contextual factors, path-dependent learning, self-herding, mere exposure, or similar processes, then it is not clear why society should treat them as sacrosanct.[293]

2. Welfare Standard Unclear

A second objection to using Pigouvian taxes to shape preferences is that it may not be obvious whether the person whose preferences

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290. *See supra* Part III.

291. *See supra* Part V.

292. *See* David George, *Meta-Preferences: Reconsidering Contemporary Notions of Free Choice*, 11 INT'L J. SOC. ECON. 92, 96–100 (1984).

293. *See* Porat, *supra* note 26, at 231 (arguing that "when merchants exploit consumers' ignorance, irrationality, and inability to organize and shape their preferences so as to serve the merchants' interests, state intervention through the law is justified"); Etzioni, *supra* note 202, at 166 ("If the preferences themselves are changeable by social and historical factors and processes that the actor is neither aware of nor controls, the actor's behavior may be nonrational and is not free."); Sunstein, *Social Norms*, *supra* note 101, at 947–48 (arguing that government may be justified in attempting to alter harmful social norms because those norms influence behavior even though people do not choose them and might wish that they were different); Cass R. Sunstein, *Legal Interference with Private Preferences*, 53 U. CHI. L. REV. 1129, 1159 (1986) (arguing that the conscious manipulation of preferences by business owners to bring about an addiction in their customers may justify government intervention) [hereinafter Sunstein, *Private Preferences*].

have changed is better or worse off as a result. If, as law and economics scholars have traditionally done, we assume that preferences are stable and that we should respect them, then a policy enhances welfare if it fulfills people's preferences to a greater degree, or in other words, gives people more of what they want. On the other hand, if preferences change because of a Pigouvian tax, it is not easy to determine the welfare effects.[294] Do we judge welfare based on prior preferences or new preferences? Scholars have struggled with this issue in the context of law-induced preference changes generally, and I do not claim to have a definitive answer.[295] There are, however, some good reasons not to accept this point as a basis for rejecting preference shaping per se.

First, the preference shaping that I advocate in this Article occurs in contexts in which behavior generates substantial externalities such that the government has a compelling reason to impose Pigouvian taxes. Once the decision has been made to impose a Pigouvian tax, that tax will inevitably shape preferences. Current analyses of Pigouvian taxes, however, assume that preferences will not change,[296] which potentially leads to misleading conclusions about their costs and consequences.[297] In many instances, ignoring preference shaping will overstate any loss in welfare due to substitution effects.[298] This is especially true over longer time horizons in which preferences are more likely to change. Current analyses also ignore the possibility of a social multiplier effect, which, in the case of a carbon tax is likely of enormous importance.[299] Moreover, if a Pigouvian tax affects preferences, then the optimal amount of the tax will likely differ from what it would be if preferences

294. Dau-Schmidt, *Preference Shaping*, *supra* note 27, at 84 ("[P]reference-shaping policies cannot be evaluated under the traditional Pareto and Kaldor-Hicks criteria because these criteria are based on a given distribution of wealth and preferences."); Cowen, *supra* note 85, at 254–58.

295. *E.g.*, MARTIN BINDER, ELEMENTS OF AN EVOLUTIONARY THEORY OF WELFARE: ASSESSING WELFARE WHEN PREFERENCES CHANGE 53–74 (2010) (discussing various approaches to welfare economics that attempt to address how changes in preferences impact the measurement of welfare); Crespi, *supra* note 225, at 100–14; George Loewenstein & Peter A. Ubel, *Hedonic Adaptation and the Role of Decision and Experience Utility in Public Policy*, 92 J. PUB. ECON. 1795, 1798 (2008) (explaining that a consistent assessment of welfare is difficult due to evolving preferences); Cooter, *Expressive Law*, *supra* note 197, at 598–606.

296. Crespi, *supra* note 225, at 98–99.

297. *See* Bowles, *Endogenous Preferences*, *supra* note 47, at 75 ("If preferences are affected by the policies or institutional arrangements we study, we can neither accurately predict nor coherently evaluate the likely consequences of new policies or institutions without taking account of preference endogeneity.").

298. *Cf.* Mattauch & Hepburn, *supra* note 231, at 89 ("Models that do not factor [shifts in preferences to low-carbon consumption goods] overestimate the cost of mitigating climate change and hence arrive at conclusions that less mitigation is optimal as a consequence.").

299. *See supra* Part VI.

were fixed.[300] For analyses to be realistic, they have to cope with the possibility of preference change. [301]

Second, while preference shaping can make Pigouvian taxes more effective and efficient, the failure to engage in it consciously and thoughtfully can produce the opposite result. We saw in Part II that Pigouvian taxes may crowd out voluntary prosocial behavior, e.g., where people believe that the tax represents an unwarranted attempt by the government to control or manipulate them. The government can potentially reduce crowding-out effects, but only if it takes steps to convey the need for the tax and the social norm that it is designed to reinforce. This requires recognizing that the tax and the messaging surrounding its adoption can influence preferences so that steps can be taken to ensure that the effect on preferences is positive rather than negative.

Finally, there are likely instances in which a person prefers the post-tax preferences even from the perspective of pretax preferences.[302] For example, a smoker who regrets the decision to smoke, but who does not have the willpower to quit on his own, might prefer high cigarette taxes that make smoking prohibitively expensive and that effectively force him to quit. More controversially, there may be instances in which people's current preferences are not in fact utility maximizing, but are instead the result of poor information or cognitive biases, and those people would be better off if the government took action to change their preferences.

3. Government Failure

A final objection to preference shaping is that it may reduce welfare due to government failure. In this context, government failure might occur if lawmakers are corrupt and abuse their power by shaping preferences in a way that harms the public, but serves their own interests or those of the special interest groups to which they are beholden. Or it might occur because lawmakers, though well-intentioned, are incompetent, lack necessary information, suffer from biases, or are plagued by cognitive failures so that their attempts to shape preferences are misguided.[303]

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300. *See* Mattauch et al., *supra* note 57, at 9–10 (using a highly stylized model to explore the effects on the optimal tax rate if preferences are endogenous to the tax).

301. Mattauch et al., *supra* note 57, at 3 ("[I]f carbon pricing changes consumers' preferences, not merely relative prices, then this policy will be inefficient unless it is adjusted to account for this endogeneity.").

302. *See* Cooter, *Good Citizens*, *supra* note 85, at 1594–95 (arguing that people may desire preference change where they know that it will make them better off).

303. *See generally* Gary M. Lucas, Jr. & Slaviša Tasic, *Behavioral Public Choice and the Law*, 118 W. VA. L. REV. 199 (2015).

Although government failure is a serious concern, the problem is not limited to attempts at preference shaping. Moreover, there is no reason to believe that every preference-shaping policy is so much more dangerous than policies not intended to shape preferences that preference shaping should be completely off limits.[304] This is especially true given that government interventions are likely to shape preferences even when that is not an acknowledged purpose. In any event, there are a variety of mechanisms and processes in place to reduce the risk of government failure, whether preference shaping is involved or not.[305] These include democratic elections, constitutional rights, institutional checks and balances, and limitations on the powers of administrative agencies.

B. A Framework for Using Pigouvian Taxes to Shape Preferences

The objections to preference shaping outlined in section A suggest that, as with all government interventions, policymakers should proceed cautiously in using Pigouvian taxes to shape preferences. This section sketches out the beginnings of a framework to help policymakers determine when it is appropriate to use Pigouvian taxes to shape preferences.

1. Large Externalities

Preference shaping is more likely to be beneficial when existing preferences generate substantial externalities. Preferences for carbon-intensive goods are a case in point. The global warming externality is large, especially if we account for potentially catastrophic tipping points.[306] Due to the severity of the threat, the government has a strong justification for taking steps to alter preferences for driving, electricity usage, meat consumption, and other carbon-intensive goods and activities.[307]

2. Large Internalities

Preference shaping is more likely to be beneficial when existing preferences are both socially harmful and result from failures of

304. Dau-Schmidt, *Legal Prohibitions*, *supra* note 26, at 168–69.
305. *Id.* at 169–70.
306. Thomas Lontzek et al., *Stochastic Integrated Assessment of Climate Tipping Points Indicates the Need for Strict Climate Policy*, 5 NATURE CLIMATE CHANGE 441, 441–43 (2015).
307. *Cf.* Dau-Schmidt, *Legal Prohibitions*, *supra* note 26, at 161 (arguing that the social costs of drunk driving and drug use justify preference-shaping policies with respect to these activities).

rationality that lead to a problematic internality.[308] Smoking is a good example. We have seen that smoking is often a regrettable mistake largely attributable to the fact that children underestimate the risk of addiction. As a result, the risk is low that the government will harm people if it uses taxes to deter children from developing a preference for smoking.

Moreover, the justification for preference shaping is even stronger in cases in which both internalities and behavioral contagion are present. By increasing preferences for the problematic activity, behavioral contagion magnifies the social harm—both by worsening the externality that flows directly from the activity and by creating an indirect externality. Smoking, for example, is contagious, which magnifies the harm from second-hand smoke and creates an indirect harm resulting from the fact that a person's decision to smoke will cause others to smoke, despite the fact that smoking is often a regrettable mistake.

3. Beneficial Preference Change Likely

In some instances, there may be uncertainty about whether preferences will in fact change and whether if they do change, the change will enhance welfare.[309] The rationale for using Pigouvian taxes to shape preferences is stronger where we have evidence that preferences will change and will do so in a way that not only reduces externalities, but also increases consumer utility or at least leaves consumers no worse off than they were previously.[310] This is especially likely to be the case for social problems that involve a mix of externalities and internalities.

Smoking again provides a good example. Jonathan Gruber and Sendhil Mullainathan have found evidence that people with a propensity to smoke are happier in states with higher cigarette taxes, apparently because the taxes discourage them from smoking.[311] Specifically, Gruber and Mullainathan find that people who would likely have smoked in the absence of cigarette taxes, but who do not smoke because of the taxes, are happier as a result. Although not conclusive, this finding suggests that people with a propensity to smoke are better off when

308. *See* Sunstein, *Private Preferences*, *supra* note 293, at 1164–69 (arguing that preference-shaping policies are justified to overcome myopia and cognitive biases).

309. *See* Porat, *supra* note 26, at 225 (noting this objection); Crespi, *supra* note 225, at 100–01.

310. Sunstein, *Private Preferences*, *supra* note 293, at 1162 (arguing that laws mandating seatbelts are justified because, after people have adapted to seatbelt use, it is no longer costly).

311. Gruber & Mullainathan, *supra* note 256, at 2.

the government uses taxes to avoid their developing a preference for cigarettes.

4. Transition Costs Low

Even where preferences are likely to change, the loss of utility that occurs before they change may still be high. Conversely, if these transition costs are low, the argument for shaping preferences strengthens.

Preferences for driving illustrate this point. Evidence suggests that the government could decrease preferences for driving and increase preferences for alternative modes of transportation by combining a carbon tax that makes driving more expensive with investments in public transit. For those who are not already driving dependent when the tax is adopted, the tax may prevent them from developing a preference for driving. Instead, they may develop a preference for city life and public transportation—thereby avoiding any transition costs. The tax would, however, place a significant burden on people who are already driving dependent because, for example, they live in the suburbs far from work and are not used to public transit. The loss of utility that occurs before preferences adapt is a real welfare cost of the tax.

5. Homogeneity or Narrow Tailoring

The case for preference shaping is stronger when people who have a socially harmful preference are homogenous with respect to the factors listed above. In other words, most people who hold the preference generate externalities and internalities, government intervention is likely to change their preferences, and transition costs are low.

If people are not homogenous, the case for preference shaping may still be strong if the government can tailor the tax narrowly or the tax imposes low costs on those whose behavior is not harmful. Smoking again provides a good example. We have seen that most smokers start smoking when they are children and that many children underestimate the risk of addiction, which leads to adult smokers who regret their youthful mistake. As a result, the use of cigarette taxes to deter children from developing a preference for smoking and to encourage adult smokers to quit likely produces a large benefit to society without much harm. The one caveat is that some smokers have difficulty quitting even in the face of high cigarette taxes. Because smokers are disproportionately poor, the burden of the taxes can be financially significant.[312] Having said that, the benefit of cigarette taxes in avoiding

312. Smoking is much more prevalent among the poor and uneducated than among the rich and educated. CENTERS FOR DISEASE CONTROL & PREVENTION, *supra* note 217.

preferences for smoking also largely accrues to the poor, again because the poor are disproportionately likely to smoke.

Conclusion

I have argued that, contrary to standard assumptions in economics, Pigouvian taxes can shape preferences and that policymakers should consider using them for that purpose. I have explained in detail the psychological mechanisms through which these taxes can alter preferences and have shown that once we relax the assumption of fixed preferences, the already strong case for Pigouvian taxes often becomes even more compelling. Specifically, preference endogeneity means that the harm to consumers resulting from Pigouvian taxes will often be smaller than standard analysis suggests. Moreover, malleable preferences dramatically expand the potential scope for Pigouvian taxes and enhance their impact on behavior through a social multiplier effect that can make taxes more effective in achieving public policy goals than scholars have traditionally assumed.

While the possibilities for preference shaping are promising, a major question that will arise with respect to any given Pigouvian tax is whether it will change preferences, and if so, whether people will view themselves as better off with the new preferences than with the old. Answering that question is challenging, but not impossible. One approach is to try taxes at the city or state level and then assess their effects before implementing them more broadly. Pilot programs like the one used by Stockholm to evaluate congestion pricing can also provide information about preference change at relatively low risk and cost. In any event, given that we know that Pigouvian taxes, like any other significant government intervention, are almost certainly going to modify people's preferences, we cannot accurately assess their likely consequences by invoking the outdated simplifying assumption that preferences are fixed.