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Consumer Behavior and Sustainable Development in China: The Role of Behavioral Sciences in Environmental Policymaking

Fernando Dias Simões ^{1,2}

¹ Room 2022, Faculty of Law, University of Macau, E32, Avenida da Universidade, Taipa, Macau, China; fernandodsimoes@umac.mo; Tel.: +853-8822-4077

² gLAWcal—Global Law Initiatives for Sustainable Development, 98 Hornchurch Road, Hornchurch, Essex RM11 1JS, UK

Academic Editor: Paolo Davide Farah

Received: 13 April 2016; Accepted: 8 August 2016; Published: 6 September 2016

Abstract: China’s astonishing economic development over the last decades has produced a momentous impact on the country’s environmental equilibrium. Chinese officials are now confronted with the need to tackle environmental problems without disrupting the country’s development. The Chinese government seems keen on striking a balance between these two apparently contradictory goals by promoting the concept of “ecological civilization”, a notion that emphasizes the importance of individual behavior. Over the last few years, environmental policymaking worldwide has been giving a lower profile to the role of the State and placing increasing responsibility for many environmental issues on citizens/consumers. Individuals are increasingly perceived as agents for environmental change and their behaviors are subject to tighter scrutiny. Due to the emergence of a consumer society in China, individual behaviors are increasingly a source of environmental problems and a key component of efficient and long-lasting solutions. Accordingly, Chinese policymakers should recognize the environmental significance of individual behaviors and look beyond traditional policy tools. This article argues that Behavioral Sciences can offer important lessons and help in designing new strategies that can speak directly to the Chinese people as a source of environmental harm, thus reducing their impact on the environment.

Keywords: China; environmental policy; sustainable development; ecological civilization; consumer behavior; behavioral sciences

1. Balancing Development and Environment: Creating an Ecological Civilization

Over the last decades, China has been experiencing a period of economic development without parallel in the history of humankind. This astonishing revolution impacted not only the country’s economic, social, and cultural fabric, but also its environmental equilibrium. Chinese officials are now confronted with the delicate question of how to tackle environmental problems without disrupting the country’s economic development.

For the Communist Party of China (CPC), a compromise between those two apparently contradictory goals seems to lie in the notion of “ecological civilization” (*shengtai wenming*). A recent addition to the official vocabulary, this concept is tied to the goal of achieving a *xiaokang* society (all-round well-off society) and increasingly highlighted as an essential part of the country’s development plan together with economic, political, cultural, and social progress. In 2007, then-President Hu Jintao advocated Ecological Civilization for the first time in his report to the 17th National Congress of the CPC [1]. The term has also been translated as “conservation culture” or “ecological progress” in official documents [2]. Five years later, in his report to the 18th National

Congress, Hu Jintao emphasized that “promoting ecological progress is a long-term task of vital importance to the people’s wellbeing and China’s future” [3]. Such is the importance given to the concept of Ecological Civilization that it is now enshrined in the Constitution of the CPC [4].

Many of China’s—and the world’s, for that matter—most complex environmental problems result either directly or indirectly from people’s daily decisions and behaviors. Apparently insignificant acts and choices, when multiplied by the global population, have a significant negative impact on the environment [5]. While industrial sources continue to be a major cause of pollution, individuals are the largest remaining source of many pollutants [6]. Consumption patterns and choices influence our quality of life in profound ways, having a considerable effect on both the individual and the society at large. As a result, individual behaviors and lifestyles lie at the core of both environmental problems and their potential solutions [7]. This is also true for China, and in overwhelming proportions, as it is the most populated country on the planet. China more and more evidences the typical symptoms of a “consumer society”, at least if we consider its frantic cities overflowing with a new urban middle class eager to attain a Western lifestyle [8,9]. The country’s economy is no longer focused exclusively on serving as “the factory of the world”—it also needs to satisfy a domestic market that is 1.3 billion people strong. The rise of the middle class represents China’s shift into the role of a consumer society but also puts mounting pressure on its environment.

Governments have long discussed, designed, and implemented policies to educate individuals, influence their decisions, and reduce the environmental impact of their behaviors. The term “environmental policy” has been said to include all governmental measures aimed at assessing the state of environmental pollution; evaluating this pollution in relation to the threat it poses to either human welfare (anthropocentric) or ecosystems (ecocentric); and controlling polluting activities by means of regulations, economic incentives and/or training, moral persuasion, information campaigns and collaborative contractual arrangements with selected target groups [10]. Yet, environmental policy has hitherto failed in addressing the relationship between individual behavior and environmental degradation. Individuals are increasingly perceived as agents for environmental change and their behavior subject to tight scrutiny. While the industry is still the main culprit for environmental degradation, individuals can also play a decisive role in the protection of the environment. Over the last years environmental policymaking has been giving a lower profile to the role of the State and placing increasing responsibility for many environmental issues on citizens/consumers [11]. This article argues that due to the emergence of a consumer society in China, individual behaviors and decisions are increasingly a source of environmental problems and should therefore be regarded as a key component of efficient and long-lasting solutions. Chinese policymakers need to look beyond the traditional tools and recognize the environmental significance of individual behaviors. It is argued that Behavioral Sciences can offer important lessons and help in designing new strategies that speak directly to the Chinese people as a source of environmental harm, thus reducing their impact on the environment.

2. Traditional Public Policy Approaches to Individual Behavior

2.1. Regulation

Historically, environmental policy has relied mainly on regulatory instruments. Public authorities enact laws or mandates, directing behaviors by imposing constraints and threatening sanctions. Regulation sets clear protocols and expectations of what is required from citizens and serves as a benchmark for individual behavior. Restrictions, bans, compliance rules, and similar forms of regulation impose limitations that individuals are expected to comply with. Governments introduce an assortment of regulatory measures designed to restrict (e.g., an environmental speed limit designed to reduce air pollution by reducing driving speed) or eliminate (e.g., ban on dumping of waste) individual choices. For example, regulation is the approach used more frequently within member-states of the

Organization for Economic Co-operation and Development (OECD) to influence the environmental impacts of household decisions [12].

Over the last decades China has been introducing regulatory tools and enforcement mechanisms designed to protect the environment [13]. However, despite the existence of an expansive environmental law framework, implementation of laws and regulations in practice has been notoriously weak [14]. While China's environmental law and administrative structure now assumes a form that would fare well in comparison to that of many developed countries, the creation of a culture of environmental protection has lagged behind the legal developments [15]. A few years ago Wang Jin, a professor at Peking University's Law School and head of the All-China Lawyers' Association's Environmental and Resources Law Committee, argued that "China's green laws are useless" [16].

In order to change individual behavior and build an Ecological Civilization, China can create new regulations or improve the existing ones. The Chinese government has stated its intention to pay attention to top-down design of building Ecological Civilization and improve related laws, regulations, and policies [17]. New regulations can even build on existing institutions. However, the administrative and judicial competences required for the design, implementation, and enforcement of effective regulation should not be underestimated [18]. Furthermore, as happens in many jurisdictions, existing environmental laws focus on controlling the impacts of resource extraction and the disposal of waste, being directed primarily at large emitters and making scarce efforts to regulate individual behavior. Traditional regulation frequently fails to capture environmental harm that arises from individual behavior [7]. Finally, there are limits to what governments can achieve through this conventional means of bringing about change. The kind of problems that China, like many countries, now needs to solve requires changing the behavior of citizens, whose private actions are hard to regulate by laws and commands. The use of rules and mandates, which was the normal reflex action of policymakers in recent decades, is no longer such an attractive option [19].

2.2. Public Information Campaigns

Public information campaigns are one of the preferred policy approaches to change the behavior of citizens in many fields of public intervention. Public awareness is a powerful mechanism as it can encourage citizens to voluntarily change their behavior. Education and information are the cornerstones of many public initiatives, generally supported by media communication and other social marketing tools. Public information campaigns help raise individual and households' awareness of the environmental impacts of their consumption patterns and decisions. Well-informed and educated individuals will probably decide to take the necessary changes for a different lifestyle without the need to resort to more intrusive or coercive measures.

Chinese citizens, the basic subjects of Ecological Civilization construction, are still in an elementary stage of awareness regarding the concept and its implications. Evidently, raising public consciousness about this new paradigm and its requisites will be decisive for its implementation in a real-life context. In a 2012 report, the China Council for International Cooperation on Environment and Development stated that the concept of ecological civilization requires the promotion of values and norms that support ecological and direct social activities, the promotion of a change of lifestyles; the enhancement of public awareness and action on the part of citizens; and the encouragement of green consumption patterns [20]. Vice Minister Li Ganjie pledged to "establish and carry forward the idea of ecological civilization in the society", promoting the concept by stressing the ideas of "respect for nature, reconciliation with nature and protection of nature" and mobilizing "all social forces to participate in the building of ecological civilization". In order to do this, the government will set special columns in the media to enhance the publicity of basic state conditions, state policies, and related laws and regulations. The idea is to "plant the seeds of ecological civilization in industries, companies, schools, communities, and families" [17]. Besides promoting the general concept of ecological civilization, public officials can design more specific information-based policies so as to enable citizens to make more environmentally friendly decisions. The use of eco-labels, for instance,

enables households to make more informed decisions with respect to both the private (e.g., financial cost) and public (e.g., environmental impacts) consequences of their choices [12].

Nevertheless, even if “information is power”, sometimes individuals just do not want to be empowered. Citizens are not necessarily willing to be informed and—more importantly—to act properly upon that information. Individuals are free to refuse such information, to ignore it, or not to change their behavior. A policy which relied purely on raising public awareness would be condemned to fail—public information campaigns and information-based instruments always need to be coupled with other types of mechanisms.

2.3. Market-Based Instruments

Public policy approaches to changing behavior have also frequently relied on economic instruments. Governments seem to believe that individuals will only be willing to change their behavior if they have some self-interest in doing so. Citizens want to avoid costs (e.g., the payment of fines) and achieve material rewards (e.g., subsidies). Economic instruments aim at promoting eco-friendly decisions by changing the relative prices of goods and services depending on their environmental impact. Well-crafted economic incentives and disincentives can guide people to adopt socially desirable behaviors. While regulations that limit or restrict certain behaviors are ‘non-voluntary’, market-based instruments are “voluntary”. The Chinese government has expressed its intention to create new environmental economic policies, push for green taxation, and conduct further research on environmental taxes [17].

One important benefit of this type of policy tool is that it can produce visible results very fast, frequently yielding positive outcomes as soon as a measure is introduced. Considering that some environmental problems need to be dealt with immediately, policy tools that can secure effective behavior change quickly are appealing. However, in the long run the effect of such measures can fade away. In this case citizens respond to the fiscal stimulus and not to the principles underlying it. Consequently, they are likely to relapse into their previous behavior patterns once the incentive is removed. Their behavior is changed by a superficial response to a carrot or a stick, rather than through commitment to a point of principle [21]. This seems to be contrary to the thorough change of mind-set which is implied in the concept of Ecological Civilization.

Furthermore, this model is based on the concept of rational actors who perfectly evaluate the costs and benefits of their decisions. If incentives and disincentives are designed and put in place accurately, citizens’ environmental behavior will be altered accordingly. Traditional Economics assumes that individuals are rational agents who are self-interested, fully-informed, outcome-oriented, and time-consistent. However, social scientists have demonstrated that human behavior is often irrational, imperfect, uncontrolled, and time-inconsistent [22]. Various empirical studies show that in some cases rational choice might be a poor guide for economics in general, and for environmental economics in particular [23].

2.4. Technological Solutions

Finally, governments frequently look into technology to provide solutions for environmental problems. Science and technology play an essential role in environmental policy. Many environmental risks would be unknown to man without scientific research, or known too late to permit appropriate action. Environmental policy rests on a foundation of scientific research without which it would not even exist. Science helps to develop technologies that redirect human efforts from environmentally damaging to environmentally benign activities. Science policy can help to steer social and economic development, providing comparative advantages to individuals, corporations, and societies that make the “right” decisions earlier than others and thereby defining the parameters of future development and reaping the social and economic benefits associated with this shift of paradigm [24]. A substantial part of China’s environmental future depends on transitioning towards a less resource-intensive form of industrialization. New industrial techniques, cleaner technologies, and the shift towards energy

efficient and renewable energies all offer more sustainable solutions [25]. The country is already heavily engaged in the exploration of new technological solutions, and the government has pledged to encourage the development and application of more eco-friendly technologies [17].

Technology surely offers a substantial contribution for environmental protection. However, it should also be recognized that it only offers solutions for some types of problems and is unfit to change individual behavior. The alleged performances that technological change can bring depend upon the consistency of the incentives devised within the traditional rational model of economics. Hence, these instruments may be less effective than expected because they disregard important psychological and emotional determinants of human behavior. Frequently, technological innovations that seem promising on paper prove disappointing when implemented in real life. Technological innovation is normally expensive, so in a context of economic crisis, financial restrictions force governments to look for less expensive, inventive solutions [26].

3. The Key Role of Behavioral Science in Understanding Citizens' Behavior

Environmental policies have failed to change the behavior of citizens because governments know little about why they behave the way they do. Many traditional public policies have been designed and applied assuming that individuals act in predictable and rational ways. Neoclassical economic theory is based on the belief that the individual—perceived as *homo economicus*—is rational in that he is capable of reason and applying logic in his decisions and choices. The individual seeks to achieve his self-interest, deciding rationally between identifiable outcomes, and acting independently on the basis of complete and relevant information. For a long time, governmental policies expressed a conviction that if the right carrots and sticks were provided to citizens, along with accurate information, they would make use of their rationality to consider the costs and benefits of their actions and respond appropriately.

However, the fact is that in many situations people act in ways that are inconsistent with neoclassical theory. In the 1940s, Herbert Simon successfully challenged the “pure rationalist actor” model, which inspired most modern public policies. He states that individuals are only rational within limits because they are constrained by their “bounded rationality” [27]. Research in Behavioral Sciences, namely Cognitive Psychology and Behavioral Economics, indicates that a person’s choices in many situations deviate from the paradigm of the rational man. Some of these deviations are systematic and largely predictable [28]. Over the last few decades social scientists have been cataloguing several decision-making errors, describing them as “behavioral failures”—situations in which the individual does not behave according to the paradigm of human rationality. People rely on simplifying strategies, or cognitive heuristics, when making a decision. Given the limits of our cognitive capacities and the complexity of the world surrounding us, we have problems in processing information, understanding a situation, and determining consequences. Sometimes we decide based upon habits of thought, rules of thumb, or emotions, and not on rational reasoning and pondering. Many of these findings have been incorporated by Behavioral Economics, an emerging branch of Economics that seeks to benefit from the lessons of Social and Cognitive Psychology so as to better understand and predict people’s economic choices. Behavioral Economics deviates from the predictions of rational choice models by incorporating insights from Behavioral Sciences into Economics, giving more weight to “irrational” motives and behaviors. Several fundamental patterns of behavior have been identified by Behavioral Economics, helping us to understand why frequently citizens do not decide in the most “rational” way.

These ground-breaking findings have been compiled and disseminated in an accessible language by several books, some of which have become best-sellers [29–36]. In this day and age, the observation that people make imperfect decisions has become mainstream, almost a truism [37]. Recognizing the limitations of rational individual choice can help to re-shape public policy and guide the foundations of new theories of public intervention. The cognitive limitations of the individual are relevant not only in human affairs but also in the affairs of the state [38]. As a result, behavioral findings are becoming more and more relevant for policymaking [39–42]. Public entities need to move beyond the,

until now, pervasive paradigm of citizens offered by economists as rational information processors to an understanding that draws on different Social Sciences to recognize individuals as less than perfect decision-makers. If policymakers want to change individual behavior they need to have a thorough understanding of how human beings think and decide [19]. Behavioral Sciences offer a more sociological understanding of the individual and make way for a new phase of state-citizen relations characterized by extreme reflexivity [43]. They provide a precious but often undervalued knowledge base for effective behavioral change in different fields of public policy. Policymakers should recognize, for instance, that Psychology can be very helpful in contributing to foster behavior change among individuals, groups, and organizations and to help guide policy directed toward these changes.

The findings offered by Behavioral Sciences have been causing mounting political impact. Countries like the United Kingdom [44] and the United States [45] have created special units devoted to behavioral research to assist in the design of public policies. Furthermore, non-governmental [46,47] and international organizations such as the OECD [48–50] and the World Bank [51,52] have also started to discuss and recommend a number of initiatives rooted in behavioral findings. Behavioral Sciences are also gradually making inroads into policymaking at the European Union (EU) in a variety of fields. In 2010 the European Commission set up a Framework Contract for the Provision of Behavioral Studies. Its purpose is to facilitate the running of behavioral studies in support of EU policymaking. A formal collaboration between the Directorate General for Health and Consumers and the Joint Research Centre, entitled Behavioral Studies for European Policies (BESTEP), was established. In the same year, two reports were published: a report on the implications of behavioral insights for consumer and health behavior [53] and a study on consumer decision-making in retail investment services [54]. The next year the European Commission published a report entitled “Nudging lifestyles for better health outcomes” [55]. In 2013 the Commission issued a policy brief dedicated to “Applying Behavioral Sciences to EU Policy-making” [56]. The purpose of this policy brief was to introduce the notion of behavioral studies for EU policymaking. The report acknowledges that “policy-making can greatly benefit from a better understanding of people’s behavior” and that “well-designed behavioral studies can offer useful insights to policy-makers by generating the evidence required to improve policies”. More recently, the European Commission released a report offering a state-of-the-art view of the contribution of behavioral insights in a range of areas and advocating for their use throughout the policymaking cycle [57]. The European Commission’s increasing interest in applying behavioral findings to its policymaking process is also evidenced by the reoccurring organization of international conferences on the theme.

4. Expanding the Green Toolbox: The Nudge Theory

The new insights offered by Behavioral Sciences are slowly being incorporated into novel policies in the environmental realm. These new policies—often referred to as “pro-environmental behavior changing policies”—have been designed to change the behavioral norms that have emerged as part of our mass consumption societies and to encourage individuals to reduce the demands that they place on the environment [58]. These sciences can help decision makers to understand the environmental consequences of their choices and the human consequences of environmental processes and policies [59]. Beretti, Figuières, and Grolleau introduced the idea of “behavioral capital”, defined as the latent potential of behavioral change to affect improvement in environmental quality [26]. They argue that traditional regulatory tools are insufficient for addressing modern environmental issues and ensuring sustainable development. Without discarding these solutions, the authors contend that since human behavior is a significant contributor to environmental problems, it should be regarded as a key component of continued solutions.

The fact that individuals deviate in predictable ways from neoclassical assumptions of rationality has been widely recognized in the academic literature and has become well known to the public. Only recently has it begun to shape regulatory policy. Public agencies have begun to develop policies that reflect the insights of behavioral economics. Environmental policy-making based solely on

neoclassical economic theory is insufficient, and sometimes totally misguided, for achieving the desired public response. Decision-making is conditioned by the cognitive limitations of the human mind. Policymakers need to develop new insights about how to approach citizens or perhaps re-emphasize ways of understanding that have been neglected. If existing behavior lies at the root of current global and local environmental and socioeconomic threats, then massive behavioral change is required to address these alarming problems.

Any effort to promote lasting environmental improvement must change individual attitudes and decisions [60]. Many of the factors that lead to bounded rationality are commonly found in the environmental realm. Behavioral failures result in defective environmental decisions [61,62]. Therefore, environmental policies based on the rational man paradigm are insufficient, and sometimes totally misguided, for achieving the desired public response. Dawney and Shah [63,64] distilled several concepts from Behavioral Economics and Psychology down to seven key principles that highlight the main shortfalls in the rational man paradigm and are relevant for environmental policymaking: other people's behavior matters; habits are important; people are motivated to "do the right thing"; people's self-expectations influence how they behave; people are loss-averse; people are bad at computation; and people need to feel involved and effective to make a change. Any eco-friendly policy should be built on a sound understanding of consumer behavior and the underlying psychology of the human decision making process.

Hobman et al. [65] demonstrated the impact of behavioral barriers in consumer decisions recently, specifically in the context of alternative electricity pricing schemes. The authors explain how cognitive biases operate as simple mental "short-cuts" or "heuristics" that alleviate the need for intensive cognitive processing, thereby hastening the speed of decision making. Overwhelmed by information, options, and opportunities, consumers rely on short-cuts to guide their decision making, thus saving time and energy, even if this often leads to economically sub-optimal outcomes [65]. The authors emphasize, among others, two powerful psychological forces relevant to the consumer decision making process: trust as a decision heuristic (consumers often defer to what their feelings "say" regarding whether an entity is trustworthy, turning perceptions of trust and credibility into a barometer of "risk") [65]; and the status quo bias (the tendency to stick with one's current position—frequently the default option—which may often mean avoiding decision making altogether and simply failing to act) [65].

These new insights promoted an important shift in environmental policymaking. This change is substantiated in a move away from economically orientated policies towards more psychologically oriented initiatives, based on a new understanding of human behavior. Environmental policy might become more efficient and cost-effective if it acknowledged that citizens' behavior is limited by their bounded rationality, bounded self-interest, and bounded willpower [66]. Simple, cheap, non-coercive interventions can produce significant behavioral change. Behaviorally informed strategies might have a large impact on individual behavior, potentially even larger than that of traditional tools [67]. Existing research shows great promise and has been enthusiastically embraced by scholars, politicians, and policymakers. One reason may be the low cost of many behavioral interventions. In fact, such interventions do not require a substantial investment of public or private funds and can be made without compromising economic goals.

One of the most promising contributions in this regard is offered by the so-called "nudge theory". Its creators, Thaler and Sunstein [33], draw on the teachings of Behavioral Science to argue that public authorities should perform the role of "choice architects", organizing the context, process, and environment in which citizens make decisions. A choice architect is someone who has the responsibility for organizing the context in which people decide [68]. Policymakers can steer citizens towards positive decisions through the use of "nudges", small features designed in the environment that help individuals to overcome behavioral failures and make better choices. A nudge is "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" [33]. These devices are essentially low-cost,

choice-preserving, behaviorally informed approaches to regulatory problems, including disclosure requirements, default rules, simplification, the use of salience, and social norms. They offer a cheap, smart alternative to traditional regulatory measures in multiple areas including consumer protection, financial regulation, public health, and environmental protection [69].

When the aim of these tools is to make the behavior of citizens more “environmentally-friendly”, they are labelled “green nudges”. Green nudges are basically strategies that use several behavioral biases in order to encourage citizens to adopt lifestyles showing a greater respect for the environment [70]. One of the advantages of nudges is that they go with the grain of human behavior, understanding the shortcuts and heuristics that people use to make decisions. This knowledge is valuable. For instance, if consumers cannot distinguish between energy-efficient products and energy-inefficient alternatives, they will make bad decisions. The goal is to design “smart” policies that benefit from a “scientific” (empirically based) knowledge about human behavior so as to improve the efficiency of public intervention. This theory might play a decisive role in translating those theoretical conclusions into concrete environmental policy tools. It uses many ideas previously introduced in for-profit marketing research. The novelty is that the nudge is selected by a “social planner” and is carefully chosen in order to improve the welfare of consumers, not to sell them more products [62]. Choice architects can use default rules, emphasize social norms, provide factual information, offer warnings, frame options in particular ways, make certain variables or product characteristics highly salient, etc. [71].

The use of defaults is one of the most powerful and popular tools available in the nudge catalogue. Defaults are settings or choices that apply to consumers who do not take active steps to change them [72,73]. Default settings or “default configurations” can be found in a variety of domains, determining the way consumers initially encounter products, services, or policies [74]. Behavioral research provides strong evidence that default rules greatly affect social outcomes. There are essentially three reasons why default rules have such a large effect on behavior, each of them with distinctive characteristics in the context of green defaults. The first factor has to do with the power of inertia and procrastination, sometimes described as “effort” or an “effort tax” [73]. People have a tendency to maintain the status quo [75]. When an option is presented as the status quo it becomes significantly more popular, and the more options people are given, the stronger the bias for the status quo. As a result, people frequently refuse to leave the status quo, even if the costs of change are low and the benefits are substantial. To alter the effect of the default rule, consumers must make an active choice to reject the default. They have to focus on the relevant question: how should they trade off environmental, economic, and other considerations? Because of the status quo bias, default options attract a large market share. This is concerning since they are not environmentally appropriate. The second factor has to do with the fact that citizens frequently perceive the default rule as an implicit suggestion or endorsement on the part of those who have devised the default rule. Many people appear to conclude that the default was chosen for a reason, especially if they lack experience or expertise and/or if the product is highly complex and rarely purchased, they might simply defer to what has been chosen for them. The third reason why defaults are so powerful is that they set a reference point for consumer decisions. Behavioral economists have emphasized the importance of loss aversion: people dislike losses far more than they like corresponding gains [76]. Whether a loss or a gain is involved does not come from nature or from the sky. The default rule determines what counts as a loss and what counts as a gain [77].

As default rules establish what happens if citizens do nothing at all, choice architects can set a default rule which promotes environmental conservation, without removing their ability to choose for themselves. Given innate cognitive barriers to eco-friendly behavior, making greener options the norm may be a powerful driver of choice precisely because it takes advantage of people’s tendency to avoid choosing [64]. If the nudge is efficient, social outcomes might be automatically green. A good example of a green default concerns the choice between types of electricity with different environmental impacts (for instance, renewable or “green” electricity and “standard” electricity). The question has to do with

how options are framed. When presented with a bill from the electric utility that contains a default option, few consumers will change to another electricity type [78]. Frequently the default option is not the most environmentally efficient. Hence, in order to choose “green” electricity consumers have to make an explicit effort to change—they have to “opt-in”. People have to seek out relevant information and choose it affirmatively. The deterrent effects of that requirement are large [77]. Because of the power of the default, an opt-out framing (making participation the default) is more effective than an opt-in framing (making non-participation the default) in terms of maximizing the share of a given population that participates [73]. Therefore, if the option is reversed (“opt-out” contract), consumers are given the environmentally friendly choice as a default, keeping the freedom to switch to the standard alternative if they so wish. If choice architects explicitly choose a green default, consumers may believe that they have been given an implicit recommendation, and that they should not reject it unless they have reliable private information that would justify a change [77]. Experiments have shown that individuals are more likely to choose green electricity when it is the default option [79]. Default setting has also been shown to impact the choice between incandescent light bulbs and more energy-efficient compact fluorescent bulbs [80].

The same principle can be extended to a myriad of scenarios. Companies such as banks, insurance companies, and energy suppliers have voluntarily implemented green nudges by sending statements and bills to clients by email by default and requiring customers to make a request in case they prefer to receive paper mailings [62,70]. Another option would be to make an energy efficiency option the default when products are sold to consumers. For instance, governments could require that utilities install smart meters for new customers unless they choose otherwise; that producers of air-conditioners set the default temperature setting in eco-friendly mode [81]; that sellers of software alter the default printer setting from “print on a single page” to “print on front and back” [77]; or that websites pre-check the box to offset carbon emissions in the purchase of plane tickets, so that the consumer has to opt-out if he wishes not to buy that option [82].

Chinese authorities could build on these experiments and create mandatory rules imposing the creation of green defaults. In this scenario the nudge would be supported by a specific regulation. In any case, consumers would remain free to choose between different available options. Setting wise defaults is a powerful tool, as it demands little conscious effort by the individual to steer everyone toward better decision making. Defaults do not take away people’s ability to choose the option they truly prefer if they are willing and able to process all available information. Default rules, and seemingly modest alterations to such rules, can have an exceedingly large impact on environmental quality—potentially larger than that of economic incentives, moral persuasion, or environmental education. Especially in a period in which the standard tools—mandates, bans, and economic incentives—face both economic and political obstacles, default rules and other green nudges deserve careful attention [77].

Choice architecture opens up a wide range of options for environmental policy design. For instance, at the EU, behavioral insights are increasingly relevant to a number of areas, including sustainable development, sustainable mobility, the promotion of new energy sources, and energy efficiency [83]. In 2009, a study conducted on behalf of the Directorate-General for the Environment was released, summarizing the knowledge from marketing and economic research outlining the range and design of instruments for greening consumer choice [84]. In 2012, the European Commission published “Green Behavior” report. It discussed the use of behavioral insights to expand the toolbox to promote environmental protection [85]. Even though these are mere contributions to the debate and not an official validation of the measures therein or a promise to convert them into specific policies, the EU seems receptive to incorporating the language of Behavioral Sciences into its lexicon.

5. Implications for Chinese Environmental Policy

The astounding environmental predicaments faced by modern-day China are the undesirable by-product of a remarkable revolution in its economy and in the lifestyle of its citizens. In just

two decades the country has experienced the environmental problems that occurred in developed countries over one hundred years ago [86]. The concept of Ecological Civilization, now a keyword in all Chinese policymaking, integrates environmental protection with the economic, political, cultural, and social dimensions of modernization. This superior form of progress occurs when humankind protects and improves the ecological environment during the course of development, and is manifested by the progress of harmony between man and nature and the enhancement of peoples' concepts of Ecological Civilization [87]. The concept is deeply connected with the goal of building a "Beautiful China" and requires a fundamental change into harmonious development between man and nature, environment and economy, man and society [17]. The inclusion of Ecological Civilization as a goal in the Constitution of the CPC follows a decade of unprecedented environmental problems and protests. The high status given to this concept on a level with economic, political, cultural, and social development, shows that the party is fully aware of the extremely high environmental price paid for the country's economic boom and that such development is not sustainable. However, some experts warn that protecting the environment will test the wisdom of the country's leadership, setting a nearly impossible target [88].

The behaviors of individuals have major environmental consequences. As a result, significant environmental improvement can only be attained through an intense change in citizens' attitudes and lifestyle. Because changing consumers' behaviors is essential in order to modify environmental outcomes, a rich understanding of how individuals behave is an essential building block of environmental policymaking. One of the most important sources for improving China's environment is the Chinese public. Over the past decade there has been a dramatic upsurge in both the level of interest and the level of involvement among the Chinese citizens in improving the environment [89]. China's environmental future depends significantly on how, not only the central government but also local officials, citizens, and the international community, manage the environmental legacy of the past and elect to respond to the challenges and opportunities that reform presents [90]. The country needs to design systems of environmental governance that balance growth with civic and public interests in environmental values based on an increasing environmental consciousness in Chinese society. Indeed, environmental problems are emerging as a central element of a newfound sense of individual rights in China, and as a central element of a newly emerging consciousness of individuals' roles as global citizens [91]. In the words of Pan Yue, "China's people have the biggest stake in environmental protection, and so must become the driving force" [92].

While it is true that the Chinese people have a decisive role to play in protecting the environment, it should also be noted that they are not a homogenous entity. The country's unique, complex, and diverse social and economic landscape needs to be taken into account. Studies show that Chinese citizens' environmental behaviors vary widely [93–95]. Determinant factors for this diversity include net income and education levels [96], age [97,98], gender [99], place of residence [100], and prior exposure to environmental harm [101]. Tools based on a "one size fits all" approach are doomed to failure. Behaviorally inspired policies such as green nudges should recognize the diversity of profiles and be shaped accordingly in order to maximize their potential positive effects.

In response to its emerging environmental dilemmas, the Chinese government has started creating new environmental policies. In the past, China has relied essentially on regulation. Several market-based instruments, such as the green credit policy and the emissions trading system, have been initiated. However, China needs to shape new policies, new roles, rights, and duties for individuals in society. This process of value creation and setting of new social norms can foster a growing sense of environmental citizenship [102]. The goal of environmental policy is to change the behavior of individuals and organizations in the direction of more sustainable, long-term, environmentally responsible actions. Thus, the implementation of green growth policies typically requires persuading individuals or groups to reduce consumption in situations where economic models of rational behavior argue against such reductions [103]. Conventional policy interventions do so either by command and control or by changing incentives, applying both carrots to encourage desirable behavior and

sticks to discourage undesirable actions. This understanding of policy intervention is too narrow. First, conventional policy interventions are not using the full range of goals that motivate behavior and changes in behavior. Second, conventional policy interventions do not utilize the full range of processes that people use to decide on a course of action. Behavioral research suggests that there might be cheaper and more effective ways of achieving environmental goals than taxes and regulations [104].

Chinese environmental policymaking should be open to new types of actors and be inspired by new types of approaches. Looking beyond the power of formal regulation and acknowledging the importance of behavioral research for changing attitudes and decisions is an essential part of the construction of a global policy for environmental protection in China. The severity and diversity of the environmental problems faced by China requires action on different levels, making use of old tools and new techniques. Behavioral research expands the environmental policy toolbox and offers new insights and perspectives on how to bring about significant environmental change. Social Psychology and Behavioral Economics offer effective, and potentially inexpensive, tools to change the behavior of individuals and help address environmental problems. If policy makers apply an understanding of social norms, cognitive biases, competing motivations, group dynamics, and other insights from social Psychology and Behavioral Economics, they have the potential to significantly motivate environmentally beneficial changes in individual and group behavior.

The findings of Behavioral Sciences may become a turning point for Chinese rulemaking theory and practice. By showing how people actually make choices, cognitive sciences enable the better formulation of rules and the provision of more adequate responses to the public interest which they are intended to satisfy. Therefore, the real contribution which cognitive sciences may give to regulation will be to limit or avoid regulatory failure. For the regulatory process to evolve, an effort should be made to incorporate cognitive insights into almost all of its phases [105]. Behavioral Sciences, once integrated in the policy making process, have the potential to not only remove the bias from citizens, but also from the experts and the policymakers themselves. Policymakers as well as experts rely on heuristics and, as a result, are subject to predictable biases [106]. Decision makers are also subject to biases, heuristics, and a number of other influencing factors. Being aware of these potential pitfalls can help when developing and pushing forward new policies.

Behavioral findings, and particularly the nudge theory, present policymakers with important insights on the determinants of human behavior and are thus of great use for environmental policy making. Effective environmental policies must be based on a coherent conception of human nature that speaks to the relationship between how people approach new information, how information relates to motivation, and how information and motivation relate to behavior change [107]. Several field experiments testing the effects of green nudges have been conducted over the last years for a variety of ecological purposes, including energy efficiency and pollution prevention [108]. The “green nudge community” is a new and spirited voice in whether behavioral sciences can contribute to better environmental policy [109]. The use of green nudges seems to hold promise, especially since the psychological factors on which nudges rely are particularly prominent with relation to environmental issues. Chinese policy makers might benefit from the learnings offered by scholars and non-governmental organizations that have been testing green nudges over the last years, or conduct their own experiments.

However, it must be recognized that we are still a long way from knowing how best to translate our understanding of people’s decision processes from the social sciences into viable policy interventions. More research is needed in order to clarify what works, to what extent and in what circumstances. It is still open to debate exactly how to translate these findings into viable policy instruments that encourage behavioral change. Behavioral instruments need to be tested, adjusted, refined, and systematically evaluated to determine if they improve environmental economic-based advice [66]. Green nudges—as nudges in general—are not a panacea for the ills of the world. Still, they remain valuable motivational procedures when used alongside existing instruments. An understanding of choice architecture expands the policy toolbox. Therefore, nudging should be part of a broader policy package combining

several instruments. There is a strong case for the continued use of the more 'conventional' tools of government intervention, such as those based on regulation and financial incentives, possibly coupled with some experimental behavioral instruments [110]. In some cases regulations can even be used to underpin nudge interventions. Behaviorally-informed regulation should be based on a careful analysis of the kind of behaviors one wants to change and on the factors influencing them. The success of nudge—like any other instrument—will depend on the context and on the type of behavior targeted.

Concerns over environmental degradation are leading governments all over the world to take action to change the way people behave. However, for a variety of reasons, not all countries are equally committed to behavior change. This is partly because of different levels of awareness, lack of resources, or limited political power. Behavior change and environmental policies are made in political, economic, cultural, and geographical contexts, largely different from one country to another [111]. Learning from the experiences of other countries, including their successes and failures, is an important source of knowledge for Chinese policy makers. However, learning about instrument choice and design needs to be a cautious process, always talking of the economic, social, and cultural specificities of China. Levinson and Peng [112] argue that Behavioral Economic research has tended to ignore the role of cultural differences in economic decision-making. They contend that most of the evidence on human irrationality is based on theories and evidence developed by Western scholars, affected by culturally guided assumptions about human minds, desires, and rationality. The authors advocate embracing culture as an important factor in the modelling of economic decision-making. Indeed, cultural and geographic contexts are specifically relevant to the understanding of an individual's behavior associated with environmental problems.

China's long and rich history and culture has a decisive bearing on citizens' environmental values and behaviors. None of the three major philosophical traditions that shaped Chinese society—Daoism, Buddhism, and Confucianism—have a match in Western thought. Mao Zedong's "conquest of nature" through the Communist Party, emphasizing organized socialist labor and productivity goals, decisively shaped societal behaviors for decades. Until the early 1980s, China was not exposed directly to international environmental laws and best management practices [113]. Since Deng Xiaoping launched his reforms in 1978, generalized poverty has given way to the rise of the world's largest middle class, paving the way for the emergence of a modern consumer culture. The traditional values that could appear to offer environmentally-friendly standards for China's economic development became largely impotent in the face of values manifested in Western-style consumption [114].

China's economic development has made changing social values a controversial topic, with some worrying that materialism may be replacing traditional values. Communist values are being eroded by a raw kind of capitalism. Many argue that an insatiable hunger for material good has replaced moral codes and guidelines in the transition from Maoism to today's "Socialist Market Economy with Chinese Characteristics". The rise of materialism has been regarded as an ethical shift from communist austerity to consumerist hedonism [115]. Xiaoying Wang has described this phenomenon in his conceptualization of the "post-Communist personality". According to the author, Deng Xiaoping's official encouragement of the pursuit of wealth, in the eighties, has given rise to a mentality bent on getting rich and which reacts negatively to any attempt at moral guidance [116]. The "post-Communist personality" is characterized by hedonism and egotism, by a fierce embrace of the ethos of consumerism, by a lack of a moral code or sense of self, and by a lack of guidance and inhibition. Despite showing no interest in a new ideology, the "post-Communist personality" retains resentment for the old ideology. The fact that the Communist Party has monopolized all ideological apparatuses has made it difficult for other social forces to contribute effectively to the development of a new, nationwide moral culture [116].

The general mind-set of the Chinese people manifests in their willingness to adjust their behavior to the current-day environmental crisis. The generations born after the reform and opening up policies of the 1980s, were brought up in a more affluent, rapidly changing setting and exposed to a radically different lifestyle. Their attitudes are not directly shaped by the memories of communist

austerity that are still fresh in their parents' and grandparents' minds. Their mind-set is comparable to that of any youngster raised in a fully-fledged consumer society in the West. Younger consumers' decision-making processes are determined by different incentives than that of the older generations who have experienced different times. Because of this "generation gap", younger generations display higher environmental awareness, which hopefully will make them adopt different priorities, not necessarily focused on strict economic considerations. Chinese university students, for instance, will become future elite and decision makers of society, and their attitudes will significantly impact upon the environmental future of the country [117]. They are a demographic group that offers a great potential for the implementation of special, purpose crafted behavioral policies.

All in all, the challenge is for Chinese policymakers is "translate" global environmental norms and values into Chinese society while taking into account the country's long history and diversity. Naturally, Chinese environmental policy is to be applied in China, and its subjects are the Chinese people. The mere transplant of devices or mechanisms applied elsewhere without taking due account of the Chinese specificities may result in the lack of compatibility of such solutions with the economic, social, and cultural context of modern China and lead to unsatisfactory results. The goal is to devise policies that combine the learnings of Western Behavioral Sciences with Chinese culture and values. While there are valuable concepts and solutions that can be imported from abroad, Chinese policymakers must build their own solutions. Chinese policy makers and public intellectuals have wrestled for decades with how to "accomplish the renovation and transformation of Chinese culture by retaining the essence of traditional culture while absorbing the best elements of Western culture" [118]. Several authors have emphasized the need to develop and implement environmental policies with "Chinese characteristics" [113,119,120]. This concept refers to a combination of traditional cultural values with contemporary science-based practices [113]. There is a need for more mixing of the best of Western and Chinese values to create new ways of thinking that are appropriate to the Chinese environmental context [114]. Designing and implementing green nudges with Chinese characteristics should be part of that larger endeavor.

Acknowledgments: The research leading to these results has received funding from the Marie Curie IRSES of the European Union's Seventh Framework Programme (FP7/2007-2013) under REA grant agreement n° 269327 Acronym of the Project: EPSEI (2011–2015) entitled "Evaluating Policies for Sustainable Energy Investments: Towards an Integrated Approach on National and International Stage", within the results coordinated by gLAWcal—Global Law Initiatives for Sustainable Development (United Kingdom).

Conflicts of Interest: The author declares no conflict of interest.

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