The Problem of Plastic Waster in China

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Abstract
Due to rapid economic growth in China, citizens are getting more and more used to littering plastic waste on the street, causing huge damages to the environment, and it is time to make some positive social change to curb this behavior. The individuals who litter on the street can have some social beliefs and expectations that are associated with their behavior. They are hypothesized to be lazier, to be more inclined to litter when they observe others litter, and to hold the belief that littering is a social good that can provide lower-income people with financial resources and job opportunities. Littering behavior is diagnosed to be a social norm, custom, and descriptive norm in different circumstances. To diagnose this behavior further, I propose a one-month interview and survey with questions that cover all the components that would be necessary to measure from a social norm perspective. To intervene on this behavior, the possible policies that could work are economic incentives, economic punishments, public education, and public shaming.

Disciplines
Social and Behavioral Sciences
THE PROBLEM of PLASTIC WASTE IN CHINA

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ABSTRACT

PRACTICAL ADVICE: THE EFFECT OF LITTERING ON MODERN CHINA

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Due to rapid economic growth in China, citizens are getting more and more used to littering plastic waste on the street, causing huge damages to the environment, and it is time to make some positive social change to curb this behavior. The individuals who litter on the street can have some social beliefs and expectations that are associated with their behavior. They are hypothesized to be lazier, to be more inclined to litter when they observe others litter, and to hold the belief that littering is a social good that can provide lower-income people with financial resources and job opportunities. Littering behavior is diagnosed to be a social norm, custom, and descriptive norm in different circumstances. To diagnose this behavior further, I propose a one-month interview and survey with questions that cover all the components that would be necessary to measure from a social norm perspective. To intervene on this behavior, the possible policies that could work are economic incentives, economic punishments, public education, and public shaming.
Problem Definition

According to article #Beat Plastic Pollution This World Environment Day published by the UN environment website with unknown published date, addiction to using plastic bags is causing severe environmental damages. Every year, about five trillion plastic bags are used in the world, about half of them are used once and then discarded. For clarification, below the picture is a classification of plastic waste by plastic composition, in which we can see that plastic bags are everywhere in our lives (Fig. 1). At present, we have about 300 million tons of plastic waste every single year, which is equivalent to the weight of all human beings worldwide. Plastic bags can occupy rivers if people are not aware of the negative impacts they cause to our society. It is worrying that the growth rate of plastic production is greater than that of any other material, and they can persist in river, ocean or land for centuries.

Figure 1: Classification of Plastic Waste by Plastic Composition. Source: “Banning single-use plastic: lessons and experiences from countries” UN Environment report (2018)

In the picture below extracted from the article #Beat Plastic Pollution This World Environment Day, we can see that the amount of plastic waste continues to grow globally, but some of the largest producing countries and exporting countries, including China, are not taking
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effective measures to manage their waste (Fig. 2). In recent decades, China has grown rapidly in its economy, technology, military force, and political power. China has become one of the major developing countries in the world. On the other hand, the side effects derived from the continuous development of the economy and technology have gradually made China a ‘risk’ society to live in.

Figure 2: Map of Mismanagement of Plastic Waste. Data from “Plastic waste inputs from land into the ocean” by Jenna Jambeck and others, published in Science (2015)

The uses of plastics include packaging, agriculture, and high-quality consumer plastics (Plastic Waste in China, 2019).

➢ Packaging – According to the article Packaging Waste – 5 Opportunities for Sustainable Development, with the rise of e-commerce and express delivery services, packaging waste is

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causing a huge problem. Plastic bag waste causes so-called “white pollution” in China. Although it is shown below that many international governments including China have imposed levy or ban on the use of plastic bags (Fig. 3), white pollution still exists because laws have not been strictly enforced. (Nov 2015 & #Beat Plastic Pollution This World Environment Day).

Figure 3: Map of Actions Taken by a Number of National and Local Governments against Plastic Pollution. Source: “Banning single-use plastic: lessons and experiences from countries” UN Environment report (2018)

- Agriculture – plastics have been frequently used to improve agricultural efficiency. It is estimated that farmers use 2.5 million tons of plastic sheeting every year to keep water from evaporating, prevent weeds from growing, and insulate during the off-season in China. China is one of the world’s most populous countries, and food production has been a top concern
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for China for centuries so that reducing this waste flow is very hard. (Plastic Waste in China, 2019).

- High-Quality Consumer Plastics – the growth of the middle class has led to a huge increase in demand for high-quality plastics. Like the healthcare market, the domestic automotive industry also has a large derivative demand for high-quality plastics. As China provides universal health care to its large and growing population, spending on medical equipment is expected to surge, increasing the scale of the waste stream. (Plastic Waste in China, 2019).

The following graphs are extracted from the article Plastic Waste in China. When it comes to white pollution, Asia leads the rest of the world. In the first picture, we can see that even among the top five plastic bag polluters, China is far ahead, releasing nearly 5 billion pounds of plastic waste into the ocean in 2010 (Fig. 4). From the second picture, it is shown that the problem will become more and more serious (Fig. 5). It is estimated that by 2025, the annual production of plastic waste in China will more than double. (Nov, 2015).

Figure 4: Total Waste Contributed to Oceans in 2010. Source: Jambeck et. al, Science, 2015
Figure 5: Total Annual Output of Mismanaged Plastic Waste. Source: Jambeck et al, Science, 2015

One of the most noticeable behaviors of interest is that citizens in China have been used to throwing plastic waste anywhere. Imagine a place where plastic waste is everywhere and trash sits on every corner on the street; you can hear the crunch of plastic waste when you step on the street; you can see that plastic waste flies through the air when a car passes by; you can smell the erosion of plastic waste in the air (Fig. 6). China is one of the largest modern developing countries in the world and a place where citizens are living richer and easier but littering has become a norm (Briana, 2015). With the prevalence of littering behavior and increasing the use
of one-use plastic products, citizens have to take seriously the problems resulting from their careless behaviors.

Figure 6. Photo by Wen Tianping. Taken in January 2011 at a littering site in Xingtai. Source: “10 Years on from the Ban on Free Plastic Bags” China Development Brief (2018)

In this paper, I will analyze the underlying reasons of this particular littering behavior, diagnose the beliefs and social expectations relevant to producing the behavior, provide a possible pragmatic measurement that is able to successfully diagnose the social expectations and conditionality of preference that are associated with the behavior, and give my proposal on how we can act to promote the positive social change.
Diagnosis

Factors that are relevant to the behavior of interest: Behaviors do not happen in a vacuum, and from my point of view, the factors that can cause this careless littering behavior in China can be various. There could be economic, educational, and psychological factors that are relevant to this behavior.

The first one is economically related. As demonstrated in the following pictures, China, as one of the largest importers of recyclables in the world, has received a high percentage of plastic products from all over the world (Desjardins, 2018 & Fig. 7 & Fig. 8). Rapid economic growth and urbanization have created the desire for people to consume, especially for younger generations, thus leading to a large number of plastic waste. In the article Littering in China, Jones pointed out that during the previous 30 years, China has experienced the fastest growth in the economy all over the world (2015). The drastic advance in the economy leads to an increase in household consumption at the same time. The statistics and tables in Consumption to replace investment as key to China growth suggested that the aggregate size of consumption in China rose threefold between 2007 and 2017 (Martin, 2018). Along with the fact that the manufacturing techniques are becoming more and more advanced in the world including China, greater consumption has led to a larger amount of waste simultaneously. (Briana, 2015).
The persistence of plastic

Ireland now ranks the 7th highest country in the EU for recycling and recovery, currently achieving 91% recycling and packaging waste.

8bn plastic bottles
7bn glass bottles
6bn aluminium cans
4bn tons of paper & cardboard

Over 95% of Irish plastic including plastic bottles in 2016 went to China

Over the past 20 years, Ireland has recycled:

60% of the world's plastic went to China last year.

8 million tonnes of plastic is dumped in the world's oceans every year since 2010 – equivalent to one lorry load every minute

Figure 7. The Persistence of Plastic. Source: Irish Times Graphics.
The second factor is educationally related. The lack of education for citizens in social responsibilities, civic duties, and environmental damages that littering can create for society needs our attention. Due to economic growth, many people become wealthier and have gained a higher social status. However, a lack of public education in ethics and civic duties causes people to disregard their social responsibilities. Thus, a lack of education in environmental knowledge combined with a lack of education in social responsibilities and civic duties can make those individuals litter plastic waste anywhere without feeling guilty. One survey conducted in Shanghai has observed that ninety-five percent of truck drivers and nearly seventy percent of car drivers threw their trash through the window when they were driving their trucks or cars, and claimed that they do this just due to convenience without knowing the damages they have done to the environment (Jones, 2015).

The third factor that is relevant to this littering behavior is psychologically related. Littering in China pointed out that studies have shown that people tend to litter in the already littered area. This kind of psychological activity corresponds to the definition of conformity. Conformity affects everyone and often leads people to change their beliefs or behaviors without feeling any guilt. In the case of littering, it is common that when people see others litter plastic waste on the street, they tend to litter without concern and regard this behavior as doing so out of convenience without feeling any unease. (Jones, 2015).

**Negative impacts of the behavior of interest:** In the book Causes and Consequences of Urban Growth and Sprawl, Basudeb details the positive and negative impacts of urbanization. The negative impacts that are derived from rapid economic growth and urbanization can be applicable in the case of littering in China. They are impacts on water quality and quantity, poor
air quality, and impacts on land, leading to impacts on wildlife and ecosystem and impacts on public and social health as well (2010).

First of all, in the article *Plastic Waste in China*, the author states that China is responsible for most plastic waste into our oceans, and is responsible for about 30 percent of the plastic waste that goes into our waterway in the world (Dec, 2015). Water pollution is not only a big problem in China but also all over the world. However, the world’s waterway is increasingly polluted by plastic waste. According to the article *Causes, Effects and Solutions of Plastic Pollution*, littering has produced most of the pollution affecting oceans in the world. This can cause horrible consequences to a lot of marine species and human beings that eat those fish marine species for food (Rinkesh, n.d.).

The second negative impact that littering can cause is land pollution. Land pollution can cause danger to wildlife and ecosystems as well. It is known that plastic is made of several hazardous chemical materials. It can interact with water and form toxic chemicals. When those hazardous chemicals go underground, they can affect land quality dramatically. The side effects of impacts on land and toxic chemical materials are various. It is possible that land pollution can suffocate wildlife to death (Rinkesh, n.d.). The images provided in the article *Littering in China* displays that cows and horses in China live in a world surrounded by plastic waste and that the landfills in China are nearly at full capacity.

Last but not least, littered plastic waste is not dealt with properly most of the time, leading to poor air quality. Plastic waste is often burned in the open air. As the article *Causes, Effects and Solutions of Plastic Pollution* pointed out, “plastic is an incredibly useful material, but it is also made from toxic compounds known to cause illness, and because it is meant for durability, it is not biodegradable.” (Rinkesh, n.d.). Burning plastic waste can decompose it into hazardous
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chemicals, polluting the air. Besides, it can create respiratory problems not only to wildlife but directly to our human beings, causing negative impacts on public and social health as well.

The negative impacts of plastic waste are obvious. It is shown that China has produced nearly 300 million tons of waste per year, most of which came from a few large cities, such as Shanghai and Beijing. Approximately 16,000 tons of waste threw away per day in Hong Kong only. What is astonishing is that China will continue to produce more waste, and it is estimated by scientists that China will produce approximately 562 million tons of waste per year until 2025. (Briana, 2015). If this behavior is not prevented effectively and immediately, it will become extremely difficult for us to recover the harms that we have done to wildlife and the ecosystem.

**Behavioral Hypothesis**

*Hypotheses for whether the individuals who are opting in to the collective pattern of behavior have beliefs and social expectations relevant to them producing the behavior:* If we hope to take successful interventions to curb this harmful collective pattern of behavior, we must figure out the underlying reasons for why people do so. Many factors can shape our human beings’ daily behaviors and decisions, including social expectations and beliefs. Expectations are beliefs, and beliefs can be either factual or normative. One example of factual beliefs is “I believe that this table is broken”. One example of normative beliefs is “I believe that all women should cover their heads and faces”. Social expectations are beliefs about what others do and believe. Empirical social expectations are beliefs about what other people are going to do in certain circumstances. Normative social expectations are beliefs about whether other people think certain actions are worthwhile to be done. (Bicchieri, 2016). In the case of littering, it remains unknown whether there are internal motivations and beliefs of those individuals who litter plastic waste anywhere. In the article *Mind the Gap: Why do people act environmentally*, it is stated that motivation can be one of the most influential internal stimuli for environmental behaviors.
Besides, as I stated before, people used to litter in the already littered areas. It is a case of doing so after observing others’ behaviors. Thus, I believe that there must be some possible beliefs and social expectations associated with the individuals who have opted in to littering.

Motivation can be the primary motivation and selective motives. Primary motivation refers to a very larger motivation that encourages us to strive for a specific environmental lifestyle, while selective motivation is just a motivation for one specific behavior. (Anja, & Julian, 2002). What causes littering can be both primary and selective motivations. Littering behavior in China is collective behavior. It is social and does not happen in a vacuum. People litter for many different reasons, but what others do or think can also affect them. It can be that they believe littering can offer low-income workers and immigrants job opportunities.

_Hypothesis about the characteristic motivational profile of the individuals engaging in the behavior:_ The characteristic motivational profile of the individuals engaging in the behavior can be complex, and I think that the conditionality of preference does exist. In the book _Norms in the wild_, Bicchieri stated that preferences can be either conditional or unconditional. Unconditional preferences refer to behaviors that are not affected by others’ opinions or whether others approve of the behavior. Conditional preferences refer to behaviors that are influenced by what others do or think (2016). In the case of littering, the empirical expectations, beliefs about how other people are going to act or react in certain situations, are enough to motivate the actions. Regarding this anti-environmental behavior and characteristic profile of those who are engaging in this behavior, I will provide my following hypotheses.

My first hypothesis is that people who observe or believe that others do litter are more inclined to litter than people who do not. The empirical belief that is relevant to this behavior can be that others litter, so can I. The empirical evidence is in _Littering in China_ that people are inclined to litter in the already littered places (Briana, 2015). As I said in the previous paragraph,
one of the possible underlying reasons for littering behavior is psychologically related. People often litter when they observe others litter.

My second hypothesis is that the individuals who hold the belief that littering can offer lower-income workers and immigrants job opportunities are more inclined to litter than those who do not have such social expectation. Littering in China pointed out that one of the beliefs and social expectations that are relevant to them producing the behavior is that those individuals believe that if they litter the trash in the trash cans, there is no need for Chinese governments to hire more street sweepers. If they pick up that plastic waste, they are taking others’ jobs. On the other hand, they think that they are providing a social benefit to others because many immigrants and low-income workers can gather some valuable stuff from the waste and sold them for money (Briana, 2015).

My third hypothesis is that lazier people are more inclined to litter than people who are not. This hypothesis depends on my life experience that it is common that people do litter out of convenience. Littering can meet their needs, and the needs of those who are not lazy are not as strong as those individuals who are.

**Preliminary diagnosis of the behavior:** In the article *A Comparison Study of ‘Motivation-Intention-Behavior’ Model*, the authors use the theory of planned behavior (TPB), one of the most influential psychological theories, to analyze the underlying reasons for household waste sorting behavior, not littering carelessly. The experiment was conducted in both Singapore and China to compare the similarities and differences of the results in both countries. The findings of the conducted experiment are applicable in the case of littering and suggests that environmental behavior is affected by environmentally motivational, habitual, and contextual factors at the same time. (Bo, Wenting & Xingchen, 2018). Motivational and habitual factors are internal ones, in other words, psychologically related, while analyzing contextual factors makes us consider the
intention of those environmental behaviors within the context of a society. In the case of littering, I think that different individuals have different motivations for this behavior of interest, and there are three cases to be considered.

In the first situation, some individuals litter because they are too lazy to go to the trash cans and disregard others’ feelings. They litter out of convenience as in the case of car and truck drivers. In this scenario, the behavior does not depend upon what others think or do. In other words, it is independent and unconditionally preferred. The individuals who litter simply because they hold the factual beliefs: (1) I have plastic waste on my hand, and I need to litter; (2) If trash cans are far away from myself, I can litter anywhere; (3) Littering in the street meets my need. This preference is socially unconditional just because they have the preference regardless of what they think others do or what they believe the society thinks they must do, leading to independent choice. Therefore, it can be regarded as a custom. (Bicchieri, 2016).

In the second circumstance, some individuals litter simply because they think that littering is a social good that can provide lower-income workers and immigrants with financial resources and job opportunities. They hold not only the above three factual beliefs but also personal normative beliefs, the beliefs about what they think should happen. They believe that they should litter no matter what others do because it is the right thing to do. The preference here is still socially unconditional. The choice does not depend on others’ thoughts or actions. In this case, this behavior relies upon the perception of moral right and can be regarded as a moral norm. (Bicchieri, 2016).

In the last situation, other individuals litter because they observe other litter. In other words, they prefer to litter because they expect that others are doing so as well, and the empirical expectations, beliefs about what they expect others to do, are enough to motivate the action. The preference is socially conditional because it depends on what they believe others do, leading to
interdependent action. Social expectations do matter in this case, especially empirical expectation. Thus, the behavior relies upon the perception of others’ behavior and can be regarded as a descriptive norm. (Bicchieri, 2016).

**Measurement**

*Measures that would cover all the components that would be necessary to measure from the social norm perspective:* Now, we understand the characteristic motivations people possibly have, helping us to measure the behavior validly and accurately. Measurement is key for studying and testing the hypotheses in the previous paragraphs. Regarding the measurement of data or empirical evidence, I suggest carrying out one-on-one interviews and online survey investigation at different places with people who happen to litter on the street. Below is my description of how the experiment can be conducted.

I can conduct the interview and survey investigation for one month at three different locations with my two assistants. The survey should first cover the questions to diagnose a moral norm and a custom. Testing for a moral norm and custom is fairly simple because what we need to test is only whether people hold the above factual beliefs and personal normative beliefs. For the first question, we can ask for how frequently you litter on the street, providing us with the degree of severity that each action can cause to the environment. The answers to this question are (A) once a week (B) twice a week (C) once a month. (D) once a year. Then we can test for what the internal motivations of those individuals to litter are. We can provide options: (A) litter out of convenience (B) litter because others do so (C) littering is a social good that can provide low-income workers and immigrants with job opportunities (D) Others, please specify. The above questions can give us the answers to the existence of a moral norm and a custom. In addition, we can provide questions like what do you think would deter people in your community from littering. The possible choices are (A) economic punishment, (B) economic incentives (C) public
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shaming (D) public education about the negative impacts of littering. During the interview, the same questions and follow-up questions will be asked, but the answers are open-ended. These questions can help us have a general idea of how to carry out successful interventions.

*Measure of social expectations:* Measuring social expectations need to measure both empirical expectations and normative expectations. First, to diagnose a descriptive norm, we need to measure empirical expectations. Measuring empirical expectations typically requires two steps, which are to measure behavior and to measure people’s belief about the behavior. For the first step, I can both measure the littering behavior with monitors if possible and ask people about their behavior in the survey. The example of the question is where you litter. The answers to this are open-ended. For the second step, I would ask them about their empirical expectations about littering. The example of the question is what do you think that more than 70 percent of people engage in littering plastic waste. The answers to this are Yes and No. (Bicchieri, 2016).

On the other hand, to diagnose a social norm, we need to measure normative expectations. Measuring normative expectations requires two steps as well. The first step is to measure the existence of personal normative beliefs. To get more detailed data of this, I prefer to use a Likert scale. The example of this question is that to what degree do you agree with the following statement: do you believe that people should litter on the street because it is the right thing to do: (1) Strongly Disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly Agree. The second step is to measure people’s beliefs about the first step. The example of the question is do you think most other people said you should use a toilet, and the answers to this can be Yes and No. (Bicchieri, 2016).

*Measure of conditionality of preference:* As I mentioned before, I suppose that the conditionality of preference exists, with low normative expectations and high empirical expectations. To measure conditionality of preference, I prefer the experiment with hypotheticals
that use vignettes because it is easier to understand and can create more distances for people to answer than direct hypotheticals. I will provide fours question that corresponds to four results as follows. (Bicchieri, 2016).

The first question corresponds to low normative expectations and low empirical expectations and is that imagine that almost all of the people in Mr.Yang’s community used to litter on the street, including Mr.Yang himself. At the current time, almost all of the people in his community engage in littering, and almost none of the people said that it is wrong to litter plastic waste on the street. How likely do you think that it is that Mr.Yang will continue to litter on the street? If most people’s answers to this question are most likely, it is suggested that conditionality of preference exists in the case of littering with low normative expectations and low empirical expectations.

The second question corresponds to high normative expectations and low empirical expectations and is that imagine that almost all of the people in Mr.Yang’s community used to litter on the street, including Mr.Yang himself. At the current time, almost all of the people in his community engage in littering, and almost all of the people said that it is wrong to litter plastic waste on the street. How likely do you think that it is that Mr.Yang will continue to litter on the street? If most people’s answers to this question are most likely, it is suggested that conditionality of preference exists in the case of littering with high normative expectations and low empirical expectations.

The third question corresponds to low normative expectations and high empirical expectations and is that imagine that almost all of the people in Mr.Yang’s community used to litter on the street, including Mr.Yang himself. At the current time, almost none of the people in his community engage in littering, and almost none of the people said that it is wrong to litter plastic waste on the street. How likely do you think that it is that Mr.Yang will continue to litter
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on the street? If most people’s answers to this question are most likely, it is suggested that conditionality of preference exists in the case of littering with low normative expectations and high empirical expectations.

The fourth question corresponds to high normative expectations and high empirical expectations and is that imagine that almost all of the people in Mr.Yang’s community used to litter on the street, including Mr.Yang himself. At the current time, almost none of the people in his community engage in littering, and almost all of the people said that it is wrong to litter plastic waste on the street. How likely do you think that it is that Mr.Yang will continue to litter on the street? (Bicchieri, 2016). If most people’s answers to this question are most likely, it is suggested that conditionality of preference exists in the case of littering with high normative expectations and high empirical expectations.

It is also important to note that when it is found that people in a community believe that others think they should litter on the street, and also believe that others in the community are engaging in littering empirical and normative expectations conflict. In this case, empirical expectations dominate normative expectations, because the conflicting expectations are undermining our normative expectations (Bicchieri and Xiao, 2009). Hopefully, the above four questions can give us the answer to the existence of conditionality.

Pragmatic considerations that would be relevant to the measurement process: There are some pragmatic concerns we need to consider when we conduct such a survey and interview. First, some people can cheat during the interview and in the survey. You will never know what their real thoughts are. To minimize the effect of cheating behavior in my experiment, I would increase the sample size of the participants, not only in number. Participants with different occupations, ages, and sexes can be chosen to increase the diversity of the sample size. Aside from that, in measuring the existence of empirical expectations, we can frequently do spot checks
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on the street to increase accuracy. Third, some incentives can be necessary to boost accuracy. For instance, in the question that do you think that 70 percent of people engage in littering plastic waste, you can tell the participant directly that if you guess it right, you can have 10 RMB in rewards.

**Interventions**

*Intervention on the behavior to change it:* The last question remains how we can intervene in littering behavior to change it. The common points that can make the interventions successful are to share the information within the community of why a certain type of behavior has the negative impacts for the society, induce a collective change of factual beliefs, coordinate together to settle down a collective decision to enact change. To abandon this kind of behavior, it is necessary to change people’s needs, moral belief, and empirical expectations within the community. The abandonment of norms often requires the development of the change of attitudes or beliefs by the whole community, the action to punish the people who break the rule, and observation on the compliance of the abandonment. The change of old norm or the creation of new norm typically requires five steps, which are to change people’s factual beliefs, implement collective decision to change the behavior, implement sanctions for people who are transgressors or coordinate action, create new empirical expectations, and abandon old normative expectations. (Bicchieri, 2016).

According to that, three possible step-to-step interventions can promote positive social changes. The first one is public education, and this kind of interventions can apply to moral norms, customs, and descriptive norms. As I stated before, the possible underlying reason of littering behavior can be that people lack the knowledge of some possible alternatives of littering behaviors, and do not observe the negative impacts that littering can bring to. Volunteers can carry out education campaigns on the negative impacts about littering at the regular intervals.
especially at places with higher rates of littering. This kind of campaigns can raise the public awareness of those with little education in civic duty and environmental protection and notify those that believe littering can provide financial resources and job opportunities for low-income workers and immigrants with knowledge in environmental damages that littering can cause. This step can hopefully maximize the change in people’s factual beliefs like that littering can meets their needs, and personal normative beliefs, and cause citizens in China to implement collective decisions to change littering behavior. The possible alternatives to this step can be the use of media campaigns and intensive verbal group communication. Intensive verbal group communication can provide each with plenty of time to express their feelings with each other. They can set up their arguments, challenge others’ opinions, and reflect deeply about the littering problems from others’ perspectives. (Bicchieri, 2016).

The second one is to implement economic incentives. The Chinese government can give financial incentives such as affording 100 dollars each time for individuals who report littering behaviors of others and stop their action. Based on an experiment conducted in *A comparison study of ‘motivation-intention-behavior’ model*, when the waste management system in public policy is not mature, economic incentives are relatively important in guiding people’s environmental behavior, whereas public education and knowledge can play an important role when the waste management system becomes mature enough. (Bo, F, Wenting, Y, & Xingchen, S, 2018). Thus, economic incentives are a good way to go.

The third one is economic punishment. Unlike economic incentives, the Chinese government can impose a consistent amount of enforcement, like a fixed penalty of 2000 dollars when they observe a medium amount of waste being littered in the road, 1000 dollars for a small amount, and 4000 dollars for a large amount of waste. By imposing such a big amount of monetary punishment, the government is implementing sanctions for non-compliance. Those
three steps can create normative expectations and empirical expectations. Taking advantage of public education, people will be aware that if they do not get used to littering, the environment will be cleaner.

**Particular individuals or groups who could be leveraged to promote social change:**

Aside from that, particular individuals could be leveraged to help abandon the norm. First, people with high education in social responsibility and civic duty, such as volunteers and the environmentalists against plastic waste can be some particular individuals or groups who can be leveraged. They can help with a public education campaign, and also become volunteers for some specific campaigns. On the other hand, *Littering in China* pointed out the tension between street cleaners and the individuals who used to littering are more and more intense. (Briana, 2015) As a result, we can resort to street cleaners who are tired of cleaning those plastic waste.

**Particular programs or interventions that could work in the context of littering:** Efforts aimed at providing monetary incentives or punishment maybe not sufficient enough to abandon this norm, along with public education. According to Bicchieri, “Norms do not stand alone, and there is a web of beliefs, values, expectations, and scripts a norm is embedded into.” (2016). There is one particular program or intervention that could work. It relies on public shaming. According to the article *Littering in China*, “The Face of Litter” campaign proposed by the Nature Conservancy and the online magazine Ecozine is a good example of public shaming. The idea, proposed by the advertising agency Ogilvy and Mather and the Hong Kong Cleanup, is to decry littering and spark much-needed debate. The activists collected various kinds of rubbish from the popular urban wasteland and took DNA samples. DNA is used to create 27 facial compounds that can accurately represent eye color, hair and skin color, freckles, gender, face shape and biogeographic ancestry (Fig. 10). The DNA was carefully collected and 3 samples were posted in the streets and stations (Fig 9). The campaign was intended to shame the littering
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behavior. It ran for a week and took effect in invoking deep discussion about this behavior. Even though this campaign often ran for a short period. It is cross applicable in this circumstance. (Briana, 2015). We can propose to the Chinese government to host such a campaign. We can collect DNA from various volunteers, create a few samples, and post them in various places, such as public toilets, streets, bus stations, etc. The campaign can last for a longer period to take effect.
Figure 9: Samples at Face of Litter Campaign. Source: Business Insider Indonesia
Figure 10: Snapshot and Phenotypes at Face of Litter Campaign. Source: Web Urbanist

**Conclusion**

China's rapid economic growth has led its citizens to become increasingly accustomed to littering the streets with plastic waste, causing great damage to the environment. Some people litter because they are too lazy and disregard others’ thoughts leading to an independent choice, and littering is diagnosed as a custom in this case. Some people litter because they simply think littering can provide lower-income workers and immigrants with some social benefit, and
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littering is regarded as a moral norm in this case. Others litter because they see someone litter, and littering is diagnosed as a descriptive norm under this circumstance.

To further diagnose this behavior, I presented a month-long interview and survey with questions covering all the components necessary to measure it from a social norm perspective. The policies that might be effective in intervening are economic incentives, economic penalties, public education, and public shaming. I prefer the Chinese government to focus on public shaming policy because it targets against human selfishness. Public shaming policy is not to shame everyone indistinguishably and harshly, but a way to use DNA samples extracted from various kinds of people to provoke self-criticism from those who do litter.

how the MBDS coursework relevant for my capstone: (a) I used what I have learned in BDS 503-675 Behavioral Public Policy to analyze the proposed policies including economic punishments and economic incentives; (b) I used what I have learned in BDS 502-675 Social Norms and Informal Institutions to study the underlying relevance of descriptive norms and social norms to this topic; (c) I used what I have learned in BDS 501-675 Behavioral Economics & Psychology: Theory & Experiments to design the possible experiment to analyze littering behavior and rule out some interference factors.
References


