Disposable Mentality: Consumer Behavior Surrounding Disposable Plastics

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WPI

friends of the earth 地球之友

Disposable Mentality: Consumer Behavior Surrounding Disposable Plastics

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degree of Bachelor of Science

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ABSTRACT

Hong Kong struggles with the effects of disposable plastic usage in the food industry. This project assisted Friends of the Earth Hong Kong by creating recommendations to promote reduction of consumer disposable plastic usage. We adapted Prochaska's Transtheoretical Model of Change and conducted surveys to identify Hong Kong residents' placement on the model. We concluded that the majority of residents are aware of this issue and exhibiting few behaviors towards change. We recommend the data from our findings be presented to corporations, that the detailed storyboard given for our video be used as a guideline for continuing to move residents' through the process of change, and that different forms of media be used to continue moving residents through the process of change.

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Interviewees

- **Maegan Cowan, HKU Sustainability Office**
- **Dr. Merrin Pearse, Coordinate4u**
- **Doug Woodring, Ocean Recovery Alliance**
- **Dana Winograd, Plastic Free Sea**

We would like to thank the people listed above for their time and contribution to our project and agreeing to participate in the video created for this project.

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EXECUTIVE SUMMARY

Hong Kong struggles with managing the amount of waste it produces, especially regarding disposable plastic usage in the food industry. This issue continues to escalate as local landfills reach capacity and mainland China tightens laws on the importation of waste from Hong Kong. There are also several negative environmental effects associated with disposable plastics, such as harm to the marine environment and wildlife. Previous initiatives directed toward reducing disposable plastic usage have targeted vendors, however it is important to recognize that consumer behavior also plays a role in the amount of plastic waste being produced.

Purpose, Objectives, and Methods

The purpose of this project is to develop plans that focus on changing consumer behavior in Hong Kong around disposable plastic items in the food industry. The objectives are as follows:

1. Adapt Prochaska's Transtheoretical Model of Change (TTM).
2. Identify the thoughts, feelings, and behaviors of Hong Kong residents concerning disposable plastics.
3. Evaluate the collected data through the lens of the adapted model.
4. Provide recommendations to promote behavioral change.

Prochaska's Transtheoretical Model of Change (TTM) is a behavioral change model that states that all behavior is value based. Values can be defined as something a person has thought about, feels strongly about, choses freely, believes in, communicates to others, and acts on skilfully over time. Prochaska et al. found that there are five specific stages individuals move through when changing behavior. The transition from one stage to the next is prompted by carefully designed process-oriented interventions that influence thoughts, feelings and behaviors. To achieve the first objective, we adapted the TTM to enhance its precision. We accomplished this by defining two additional stages, strategically placing them between existing stages and, for the sake of this project, disregarding the final stage of the original model (Figure 1). These adaptations create the opportunity for greater specificity when analyzing the answers of respondents.

Figure 1: Adapted model of change

Our second objective was achieved by randomly surveying 101 Hong Kong residents. The survey identified the depth, quantity, and consistency of respondents' thoughts, feelings and behaviors.

To achieve our third objective, we developed a two-step analytical process that objectively places respondents on the adapted model. This method allowed us to set specific boundaries for each stage by weighting which questions and answers are most salient in identifying each stage. With the help of code written in Python, a high-level programming language, we calculated the maximum likelihood estimator that determined the best guess for the stage of a given respondent. Figure 2 shows the percentage of the survey population in each stage of the adapted model.

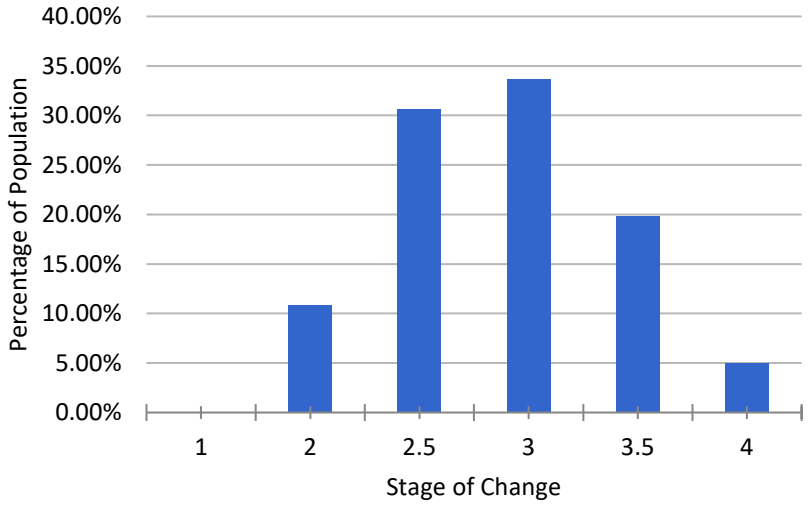

Figure 2: Percentage of population in each stage

Our fourth objective was achieved by utilizing the analyzed results from our surveys to propose processes that promote change in consumer behavior surrounding disposable plastic usage in the food industry. This was accomplished through the creation of a set of recommendations.

Results and Conclusions

Results of our survey indicate that 100% of respondents are aware of the problem regarding disposable plastics. The majority of respondents, 64%, are placed in either Stage 2.5 or Stage 3, which indicates respondents have thoughts and feelings regarding disposable plastic usage in the food industry, but only few behaviors. Less than 5% of the survey population is placed in Stage 4, which indicates respondents have consistent and deliberate behaviors. From this, we conclude that most Hong Kong residents are aware of the problem, realize the benefits of changing, and are ready to change their behaviors surrounding disposable plastic usage. Results also indicate a positive correlation between age and stage placement on our adapted model. This graph can be found in Appendix E.

Recommendations

We have provided three recommendations to Friends of the Earth on how to promote reduction of disposable plastic usage in the food industry.

The first recommendation **is that Friends of the Earth consider sharing our project data with food corporations.** Our data indicates that respondents are ready and willing to stop utilizing disposable plastic. Therefore, we conclude, are willing to not be provided disposable plastics. We have created a short document summarizing our findings. See Appendix F for more detail.

Our second recommendation **is that when designing intervention modalities, Friends of the Earth consider utilizing the science of behavioral change, specifically TTM and the modified TTM model of behavior change that we designed and tested in the course of this research.** We believe that specific interventions should be designed for every stage on the adapted model in order to effectively influence behavior change. We have created an example video, found in the additional materials, that is intended to influence an individual to move from Stage 2 to Stage 2.5 on the adapted model. A detailed storyboard of this video is provided in Appendix G.

Our final recommendation **is that Friends of the Earth consider researching, designing, and implementing creative process-oriented interventions.** The TTM and the adapted model prove that change is a process and cannot often be accomplished through a single intervention. Possible process-oriented interventions include: mobile applications, multi-stage educational programs, and ad campaigns.

CHAPTER 1: INTRODUCTION

Plastic has consistently gained popularity since its creation, becoming ubiquitous in today's society. This can be seen through the increased usage of plastic items such as plastic bags, straws, packaging, and other disposable plastics used in the food industry. The increased usage of plastics contributes to the total amount of waste being produced and causes damage to the ocean and sea life.

The availability of cheap plastic has sparked the rise of a throwaway culture in the food industry. Prior to plastics, materials such as metal, wood, paper, and glass were used for storing and transporting goods. Objects made of these materials were easily broken and required expensive repair. Plastic provided the food industry with a cheap method of mass producing easily replaceable goods. This popularized the concept of 'Throwaway Living' by replacing rather than repairing, which lead to a rise in total waste being produced.

Hong Kong struggles to manage the amount of waste it produces. Currently, the two main methods of managing waste are deposition into landfills, and export to mainland China. Hong Kong's limited landmass puts constraints on the further use and creation of landfills; as laws on exporting waste tighten, Hong Kong's waste management problem continues to escalate.

The growing issue of waste calls for a change in behaviors surrounding plastic. Previously, Hong Kong's initiatives toward reducing plastic use have targeted vendors rather than consumers. However, consumer behavior also plays a role in the issue of the sheer volume of plastic waste.

The purpose of this project is to develop plans that focus on changing consumer behavior around disposable plastic items in the food industry. The objectives that have been set are as follows:

1. Adapt Prochaska's Transtheoretical Model of Change (TTM).
2. Identify the thoughts, feelings, and behaviors of Hong Kong residents concerning disposable plastics.
3. Evaluate the collected data through the lens of the adapted model.
4. Provide recommendations to promote behavioral change.

CHAPTER 2: BACKGROUND

This section provides background information needed to understand the problem regarding the usage of disposable plastics in Hong Kong. It discusses and analyzes the history of waste management and plastics, the mentality of throwaway culture, alternatives to plastics, approaches to waste reduction, and psychological models for managing change. These topics are examined on both global and local levels to provide a better understanding and a basis for the project.

2.1 Plastic

Plastic is a synthetic material made out of polymers ("The History and Future of Plastics," n.d.). The first fully synthetic plastic was made in 1907, and since then plastic has become a key component in a variety of products. For example, in World War II, the United States used plastic for parachutes, ropes, and helmets ("The History and Future of Plastics," n.d.). As shown in Figure 1, over 300 million tons of plastic are produced worldwide every year (Gourmelon, 2015).

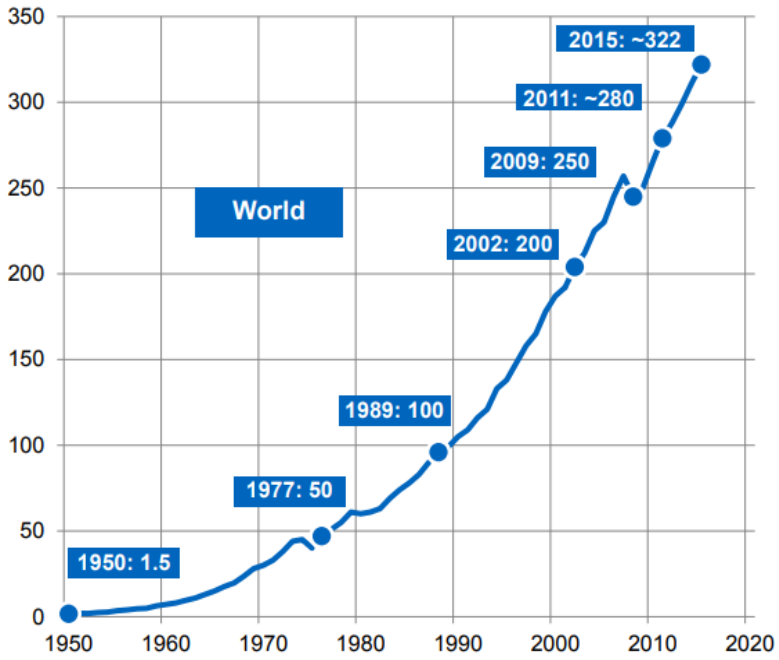

Figure 1: Plastic production per year in millions of tons ("World Plastics Production 1950-2015," n.d.)

Plastic continues to be a widely used material because it is inexpensive and durable (Wassener, 2011). China accounted for 28% of the world's plastic production in 2015, with Asia as a whole accounting for 49% of worldwide plastic production ("World Plastics Production 1950-2015," n.d.). Since its creation, 8.3 billion metric tons of plastic have been produced

(Wassener, 2011). The average North American uses 100 kilograms of plastic every year (Gourmelon, 2015). Many plastic items, such as plastic bags and plastic straws, are made to be used once and discarded. 1 trillion plastic bags are used worldwide every year, and many end up in the ocean or landfills ("Plastic as a Resource," n.d.).

Though initially plastic was viewed as favorably utilitarian, its negative impact on the environment was later recognized. In the 1960s environmental concern grew when significant amounts of plastic particles were first observed in the ocean. However, the discovery of this pollution did not stop plastic production, as it has continued to rise for the past 50 years (Gourmelon, 2015). It is estimated that each year, 8 million tons of plastic are added to the marine environment (Besley, Vijver, Behrens, & Bosker, 2017), with about 5.25 trillion pieces in the ocean altogether (Eriksen et al., 2014). This is a result of plastic waste that is not properly disposed of, and is most often carried by wind or rain into drainage systems that then flow into the ocean (Casson, 2017). This is destructive to the marine environment since plastic can take up to 400 years to degrade (Parker, 2017). The damage to the marine environment is illustrated in Figure 2 (Krejci, 2010). Ocean currents have moved around plastic waste leading to the formation of an island composed of plastic waste in the North Pacific that is larger than 1 million square miles (Montanari, 2017). Over time, plastic undergoes a chemical progress where it begins to decompose into significantly smaller fragments. These small fragments are called microplastics and are easily ingested. Recent studies have shown that 90 percent of seabirds consume plastic found in the ocean (Montanari, 2017). A seabird that has consumed plastic is illustrated in Figure 3. (U.S Fish and Wildlife Services, 2009). Fish also consume plastic in the ocean which results in health concerns for humans when they consume the fish. Whether or not the plastic is in the ocean, or in a landfill, it impacts the environment (Bayas, Buckley, Ford, & Lawes, 2017).

Figure 2: Destruction to the Marine Environment (Krejci, 2010).

Figure 3: Plastic Consumed by a Seabird (U.S Fish and Wildlife Services, 2009).

2.2 Throwaway Culture

Before the creation of plastic, common household items were constructed of somewhat fragile, yet repairable, materials such as wood and metal. Items used to store and transport goods were also fashioned from materials such as metal, wood, paper (Santhanam, 2016). Repair shops were common because repairing broken items was cheaper than replacement. (Sison, 2015). This repair mentality shifted when plastics rose to popularity.

The use of plastic in food packaging impacted both consumers and production. Plastics allowed perishable items to be sealed from air and moisture, therefore allowing food to have a longer shelf life (American Chemistry Council, 2017). Plastics served as a cheap material which allowed for cost-effective mass production (National Molding, n.d.). Due to the ease of production, many items were created to be disposable, "designed to be used only once or only a limited number of times, and then thrown away." (Dictionary by Merriam Webster, n.d.). The introduction of plastics allowed modern society to adopt an environmentally damaging lifestyle known as 'Throwaway Living.'.

The term 'Throwaway Living' was first used in a 1955 issue of LIFE magazine to highlight that disposable items epitomized the height of modern living (Cosgrove, 2014). This new concept of 'Throwaway Living' popularized the idea of replacing rather than repairing, and production shifted to follow this trend. Products were beginning to be designed with an artificially limited lifespan, known as planned obsolescence (Fitzpatrick, 2011). This planned product failure is used to generate and encourage repeat purchases and increase product sales. An exemplary model of this policy is cell phone culture, and people's desire to upgrade and replace their currently working phone with the newest model. Apple's iOS software is a

concrete example of this as new updates become incompatible with older phones, pushing consumers to buy newer products and dispose of older products (Gibbs, 2017).

This phenomenon is referred to as “Throwaway Culture.” This culture has many negative effects, including a large increase in the amount of waste being produced. Packaged food and drink products rely heavily on disposable Styrofoam, paper, and plastic containers and have become a major part of ‘Throwaway Living’, as they are often disposed of after being used once.

2.3 Recycling and Waste Management

This section discusses waste, recycling, and the problems surrounding waste production in the world and Hong Kong. It examines the effectiveness of recycling in the world and Hong Kong.

2.3.1 Recycling and Waste Management in the World

In 2012, the world generated an estimated 2 billion tons of municipal solid waste (MSW) (Karak, Bhagat, & Bhattacharyya, 2012). This represents a 400% growth in worldwide MSW production since 1997 (Karak, Bhagat, & Bhattacharyya, 2012). MSW refers to the combination of domestic, commercial, and industrial waste (Karak, Bhagat, & Bhattacharyya, 2012).

The increase in MSW has led people to explore ways to reduce waste. One of the ways people have worked to reduce waste is to increase recycling. However, due to recycling limitations, not all recyclable materials end up being recycled. For example, papers used for newspapers and notebooks are easily recycled, but much of the paper used in food packaging cannot be recycled due to the food residue. (MacKerron, 2015). Some recycling plants can handle paper with food residue, but many cannot resulting in the paper becoming more waste. However, paper bags that contain no food residue can almost always be recycled (MacKerron, 2015). This is one example of the limitations that lead to varied recycling rates across the world (“Recycling Rates Around the World”, 2015). All of the materials that cannot be recycled are added to the MSW, further filling up landfills.

2.3.2 Recycling and Waste Management in Hong Kong

Hong Kong has a massive waste management problem. According to a 2015 report, Hong Kong produced 5.51 million tons of solid waste in 2015. Of that, 2.36 million tons were domestic waste, and 1.35 million tons were commercial and industrial waste (“Monitoring of Solid Waste in Hong Kong,” 2016). The composition of Hong Kong’s waste from 2011 is illustrated in Figure 4 (Environment Bureau, 2013).

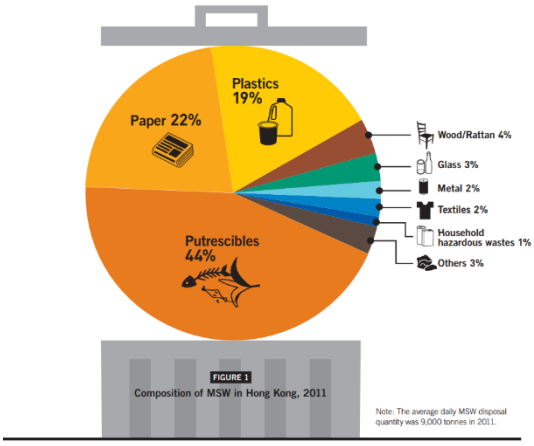

Figure 4: Composition of MSW in Hong Kong, 2011 (Environment Bureau, 2013).

In 2015 the majority of waste came from food (33%), paper (22%), and plastic (21%). From 2014 to 2015, the amount of food waste decreased 7.1%, while paper and plastic waste increased 17.5% and 8.3% respectively ("Monitoring of solid waste in Hong Kong," 2016). Hong Kong struggles with waste management because space for waste and landfills is limited. Although much of the waste is exported, over half of the MSW is put in local landfills ("Global Garbage: Urban Imaginaries of Waste, Excess, and Abandonment," 2015). Most of the waste is exported to mainland China, however as of 2017 China will be forbidding 24 types of solid waste, forcing Hong Kong to either also ban those specific types of waste or find space in Hong Kong to store the waste (Hong Kong has Nearly No Space for its Garbage, 2017). If nothing is done to reduce waste, local landfills will reach capacity by 2019 (“Global Garbage: Urban Imaginaries of Waste, Excess, and Abandonment,” 2015).

2.4 Reducing Waste and Alternatives

This section investigates alternatives to plastics and different companies who are working to reduce and eliminate plastic waste in the United States and in Hong Kong.

2.4.1 Alternative Materials and Waste Reduction in the United States

One way to eliminate or reduce plastic waste is through the utilization of alternative materials. Currently, disposable plastics used for food storage are made of petroleum-based, synthetic materials (Chin, 2010). However, petroleum is a limited resource and petroleum-based synthetics make up a large portion of the waste in landfills (Chin, 2010). As an alternative, biodegradable and compostable materials made from renewable raw materials be safely added to a landfill (Song, Murphy, Narayan, and Davies, 2009).

Campaigns focusing on finding alternatives and reducing plastic usage have also been launched. The United States population alone uses 500 million plastic straws every day (Blundy,

2016). This means that each person on average uses 1.6 plastic straws per day. Most disposable plastic straws are also made of polypropylene, which is 100% recyclable, but not often recycled (Wylie, 2017). Several alternatives to plastic straws include using materials such as stainless steel, glass, bamboo, and paper (Wylie, 2017). There is also a campaign called #STOPSUCKING that focuses on eliminating straws and encouraging people towards alternative options (Strawless Ocean, n.d.). This campaign has contributed to the ban of plastic utensils and straws in Seattle, which will go into effect July 2018 (Norimine, 2017).

2.4.2 Case Studies

Large food corporations have initiatives that aim to reduce and eliminate plastic items. Starbucks, a multinational food corporation with 25,000 stores in over 75 countries (Starbucks, 2017a), is an example of a corporation with these initiatives. Starbucks was the first company to offer a discount if customers brought a reusable cup, eliminating the use of many disposable plastic cups (Starbucks, 2017b). In addition, Starbucks is working on reducing the amount of plastic used in the production of cups, aiming to double the recycled material content of their cup by 2022 (Starbucks, 2017b).

Dunkin' Donuts is another food corporation that has taken steps to increasing the recyclability of disposable plastics. In 2015, they started using polypropylene for their cold beverage cup lids (Dunkin' Donuts, 2017). This plastic is 100% recyclable but not biodegradable or compostable (Dunkin' Donuts, 2017). In 2017, Dunkin' Donuts published that only 35% of their packaging is compostable, and 30% is biodegradable. Dunkin' Donuts has also created a reusable mug program, but has faced challenges in participation due to lack of awareness, and the convenience of using a disposable cup (Dunkin' Donuts, 2017).

2.4.3 Reducing Waste and Alternatives in Hong Kong

Hong Kong also has initiatives to reduce and eliminate disposable plastic items. This can be observed at a state level, a non-governmental level, and an individual level. The Environmental Protection Department (EPD), a division of the Hong Kong Government, has put into place an initiative targeting plastic shopping bags. In 2005, the EPD found that 8 billion plastic bags ended up in local landfills every year (Environmental Protection Department, 2015). In response, the department banned the use of free plastic bags at 3,000 chain stores and supermarkets, forcing them to charge customers per bag with the intent that plastic bag usage would decrease. The EPD's policy has slowly grown to encompass all stores, forcing retailers to charge for the bags, and creating regulations for the bags being sold.

Non-profit environmental organizations have also been involved in initiatives to reduce disposable plastic usage. Greenpeace Hong Kong, has started to encourage multinational food corporations to reduce their disposable plastic usage. In 2017, Greenpeace (2017) and its volunteers conducted a study during peoples' lunch hour and estimated that 202,800 disposable items were distributed daily in Hong Kong. Greenpeace has been working on creating campaigns, spreading awareness, and encouraging people to voice their dissatisfaction with the number of disposable items put forth by multinational food corporations (Greenpeace,

n.d.). They are hoping that through consumer dissatisfaction, greater steps will be taken by corporations to reduce disposable plastic usage.

Apart from established organizations, individuals in Hong Kong have started to make headway in helping eliminate plastic. Gary Stokes, the director of a non-profit marine organization, started to work independent of his organization with local restaurants to replace plastic straws with paper ones, and to encourage people to "just say no," to using straws. Since the start of this initiative, over 80,000 plastic straws have been replaced or eliminated from use in Hong Kong (Blundy, 2016).

2.5 Psychology of Change

This section discusses how to influence behavior change. It describes the psychology of: value based behavior, Prochaska's Transtheoretical Model of Change (TTM) and the related processes, Developmental Psychology, and Situational Leadership.

2.5.1 Prochaska's Transtheoretical Model of Change

Prochaska's TTM is an "integrative, biopsychosocial model" researched and developed in an effort to create the understanding that behavior change is a process that can be described in successive stages ("Transtheoretical Model [or Stages of Change] - Health Behavior Change," n.d.). The model states that all behavior is value based. Values can be defined as something a person: has thought about, feels strongly about, choses freely, believes in, communicates to others, and acts on skilfully over time. Thus, value based behavior refers to deliberate actions stemming from a clear set of values (Balistrieri, 2017).

Prochaska et al. found that there are specific stages people move through when changing behavior ("Transtheoretical Model," n.d.). The transition from one stage to the next is prompted by distinct processes that influence an individual's thoughts, feelings and behaviors. The timing, type, and focus of an intervention utilized in this process varies per person, but the stages remain constant ("Transtheoretical Model," n.d.). Figure 5 shows each stage.

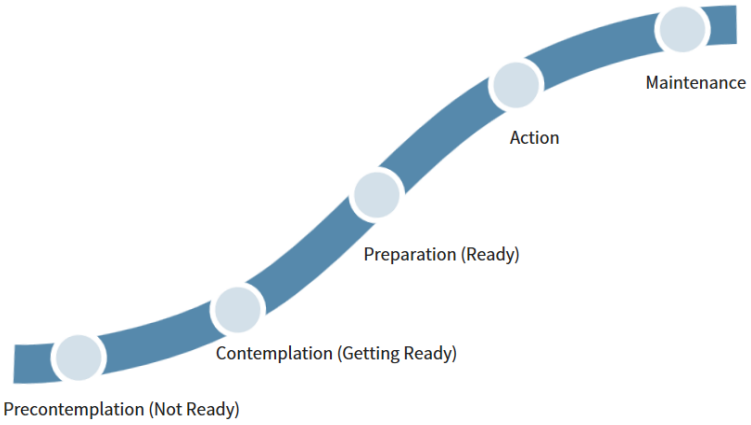

Figure 5: Stages of change ("Transtheoretical Model," n.d.)

Prochaska's model is comprised of five stages. The first stage is *Precontemplation*. In this stage, an individual has no conscious thoughts, feelings, or behaviors about an issue. The individual has no intention of changing a situation that may be either positively or negatively impacting their lives, normally due to being under or uninformed about the subject matter ("Transtheoretical model [or Stages of Change]," n.d.).

The second stage is *Contemplation*, which occurs when an individual is considering making a change ("Transtheoretical Model," n.d.). The individual begins realize the benefits of changing their behavior, but is still aware of the challenges and negative impacts of possible change ("Transtheoretical Model," n.d.). They begin to have some thoughts and feelings, but still no behavioral changes.

The third stage is *Preparation* for change. In this stage of change, an individual has many thoughts and feelings and exhibits few behaviors. The individual starts to plan for change, and begins to take action. ("Transtheoretical Model," n.d.).

This flows into the fourth stage, *Action*, where the individual makes active modifications and changes to their lifestyle and behaviors ("Transtheoretical Model," n.d.). In this stage, an individual has thoughts, feelings, and behaviors. At this point in the process an individual not only exhibits thoughts, feelings, and behaviors toward change, but their behavior has actually changed. Old behaviors have been extinguished and new behaviors have become normal or habitualized.

The final stage in this model is *Maintenance.* This stage occurs when an individual is building a history of thoughts, feelings and behaviors. In *Maintenance*, the individual builds confidence, their behavioral changes become everyday habits, and they strive to not revert back to old behaviors ("Transtheoretical Model," n.d.). When an individual reaches this final stage of the TTM, they have completed behavioral change.

In order to determine where an individual is placed on the TTM, researchers design specific questions with responses recorded on a Likert scale. Participants respond using a numerical scale that measures attitudes about a topic based on the extent of which they agree or disagree to the questions or statements they are presented (Likert, 1932). The Likert scale utilizes verbal descriptors that provide participants with a range of possible answers. These responses allow the researcher to locate the stage of the participant on Prochaska's model.

The stages of change, and the movement between them can be influenced by the processes of change ("Transtheoretical Model," n.d.). Researchers divided these processes into two kinds: Cognitive and Affective Experiential Processes, and Behavior Processes. Each process and step are defined in Tables 1 and 2 respectively (The Transtheoretical Model (Stages of Change), n.d.).

Table 1: Cognitive and affective experiential processes ("Transtheoretical Model [or Stages of Change] - Health Behavior Change," n.d.)

Consciousness Raising	Learning the facts about healthy behavior
Dramatic Relief	Emotional (either positive or negative) arousal about healthy behavior
Environmental Reevaluation	Social reappraisal to realize how their unhealthy behavior affects others.
Self-Reevaluation	Self-reappraisal to realize they want healthy behavior
Social Liberation	Commitment to change behavior based on the belief that achievement of the healthy behavior is possible.

Table 2: Behavior processes ("Transtheoretical Model [or Stages of Change] - Health Behavior Change," n.d.)

Self-Liberation	Commitment to change behavior based on the belief that achievement of the healthy behavior is possible.
Counter Conditioning	Substituting healthy behaviors and thoughts for unhealthy behaviors and thoughts.
Helping Relationships	Finding supportive relationships that encourage the desired change.
Reinforcement Management	Rewarding the positive behavior and reducing the rewards that come from negative behavior.
Stimulus Control	Re-engineering the environment to have reminders and cues that support and encourage the healthy behavior and remove those that encourage the unhealthy behavior.

Prochaska et al. originally created this model with the intent of evaluating and modifying the health related behaviors of individuals. Since its creation, it has been used to evaluate all types of behavioral change, whether it be change regarding smoking, food consumed, alcohol consumption, or consumer behavior.

Table 3: Definition of psychological terms (Dictionary by Merriam Webster, n.d.)

Habit	An acquired mode of behavior that has become nearly or completely involuntary
Mindfulness	The practice of maintaining a nonjudgmental state of heightened or complete awareness of one's thoughts, emotions, or experiences on a moment-to-moment basis.
Process	A series of actions or operations conducting to an end; *especially*: a continuous operation or treatment especially in manufacture
Subconscious	Existing in the mind but not immediately available to consciousness: affecting thought, feeling, and behavior without entering awareness
Willingness	Of or relating to the will or power of choosing
Ability	Capacity, fitness, or tendency to act or be acted on in a (specified) way; power to do something
Confidence	A feeling or belief that you can do something well or succeed at something
Deliberate	To think about or discuss something very carefully in order to make a decision; done or decided after careful thought
Holistic Model	An approach to analyzing situations or problems. Since there is no singular author of the approach, it often includes the components from; physical, spiritual, emotional, intellectual, occupational and social. (Hersey, 1969)

2.5.2 Culture Based Behavior

Conceptually, there are two main categories of cultures: individualistic and collectivistic. The emphasis on what is deemed important is what sets the two categories of culture apart. Many Eastern countries, such as countries in Asia and the Middle East, have a collectivist perspective. An individual with a collectivist perspective focuses on the needs of society before the needs of themself. Western countries, such as the United States, Australia, and most of Europe, tend to have an individualistic perspective. An individual with an individualistic perspective focuses on their own needs, choices, and actions (Biddle, 2014).

Hong Kong is located in an Eastern region, but was ruled by a Western country for 99 years, resulting in an influence of both cultures. Probably due to its history of being territorialized by the British, Hong Kong exhibits characteristics of both an individualistic and

collectivistic culture. Hofsted Insights (2018) states that Hong Kong is the least collectivistic culture in Southeast Asia as it now manifests many individualistic characteristics.

2.5.3 Robert Kegan's Developmental Theory Model

Robert Kegan (Reis, 2010) created a developmental theory which focuses on the evolution of consciousness. He believed that growth or development moved through "five progressively more complex stages of knowing," (Reis, 2010). The theory is designed from an individualistic cultural perspective. Kegan viewed the process of development as an effort to resolve the tension between a desire for differentiation and an equally powerful desire to be immersed in one's surroundings (Reis, 2010). The levels of consciousness, referred to as 'Orders', are listed in Table 4.

Table 4: Orders of development (Reis, 2010)

Order Number	**Age Range**	**View**
0	0-18 months old	I am my experience. 'There is only me'
1	2-7 years old	Begin to make meaning. 'I am part of a family'
2	7-16 years old	Begin to develop a sense of self. 'I am my needs'
3	14-20 years old	Become social. Empathy forms. 'I define myself by others'
4	16 years old and above	Form one's own values and judgements. Self-regulation. 'I am'
5	21 years old and above	Systems, people interconnect. We exist together. 'It is about us'

2.5.4 Situational Leadership

The Hersey-Blanchard's Situational Leadership Model is a leadership development and influence tool. This model is based on the understanding that an individual's leadership style is dependent on the individual's or group's readiness. There are four styles of leadership as indicated in Figure 6. Readiness is comprised of three measures: the willingness, ability and confidence, or lack-there-of in an individual.

Figure 6: Situational leadership model (Hersey & Blanchard, n.d.)

In "directing," the leader's behavior provides very little support to the follower, but the flow of information is very direct: "do [this] here, at [this] time, at [this] location." The individual is often unable or unwilling to do the task alone, and simply follows the leader's orders.

In "coaching", the leader shows more supportive behavior, but is still direct and in charge. The leader may start to provide social and emotional support to the individual and begin to relinquish their place as leader, but is still in charge. The individual is willing to do the task themselves but is unable.

In "supporting" the leader shows highly supportive behavior, and less directive behavior. The leader begins to share the decision making, and there is more of a focus on team dynamics and relations. The individual is able to perform the task, but lacks the confidence to act independently.

In "delegating", leaders exhibit low support and low directness. Often times the leader will simply monitor the tasks they delegated. The individual is confident, willing and able to perform the task. (Hersey & Blanchard, n.d.)

CHAPTER 3: METHODOLOGY

This section covers the objectives and the methods we are using to fulfil our project's purpose. The purpose of our project is to develop a plan that focuses on changing consumer behavior around disposable plastic items in the food industry. The objectives are listed below.

1. Adapt Prochaska's Transtheoretical Model of Change (TTM).
2. Identify the thoughts, feelings, and behaviors of Hong Kong residents concerning disposable plastics.
3. Evaluate the collected data through the lens of the adapted TTM.
4. Provide recommendations to promote behavioral change.

3.1 Adapt Prochaska's Transtheoretical Model of Change

We are adapting Prochaska's Transtheoretical Model (TTM) by creating additional stages that enable us to evaluate individuals more specifically as well as create subtlety between the stages. This allows us to better understand individuals on the model. Therefore, we are able to develop more targeted and effective plans to promote behavioral change.

3.2 Identify the Thoughts, Feelings, and Behaviors of Hong Kong Residents Concerning Disposable Plastics

We are randomly surveying 100 to 150 residents above the age of 18 throughout Hong Kong. We are using surveys to identify the thoughts, feelings and behaviors of Hong Kong residents regarding the utilization of disposable plastics in the food industry. This survey utilizes multiple-choice questions and a range of possible answers arranged on a Likert scale (see Appendix C).

3.3 Evaluate the Collected Data Through the Lens of the Modified Behavioral Change Model

We are overlying our survey data on the adapted model of change. As stated in the background, behavior is based on values. Therefore, we are working to identify respondents' values to discover ways to promote behavior change. The collected data is being used to associate responses with stages of this model. People are placed on the adapted model through the utilization of a maximum likelihood estimator.

3.4 Provide Recommendations to Promote Behavioral Change

We are utilizing the data that has been gathered from our surveys to research, design, and propose processes that promote change in consumer behavior regarding disposable plastic items in the food industry. We are providing a set of recommendations to accomplish the purpose of our project.

CHAPTER 4: RESULTS AND ANALYSIS

In this section we present our modification of the TTM, which we refer to as the adapted model, as well as examine the collected survey data utilizing the adapted model. We determined six distinct stages that are defined by an individual's thoughts, feelings, and behaviors relative to decreasing their usage of disposable plastics in the food industry. We have determined criteria for each of the six stages and developed a two-step process that allows us to place individuals on the adapted model. The survey was completed by 101 participants and can be found in Appendix C. What follows is the analysis of the survey results.

4.1 Adapted Prochaska's Transtheoretical Model of Change

Prochaska's Transtheoretical Model of Change (TTM) identifies five stages of change. In an effort to enhance the precision of the TTM we created two additional stages and removed the final stage of the original model, as illustrated in Figure 9. These adaptations create the opportunity for greater specificity when analyzing the answers of respondents. The stages we added are referred to as Stage 2.5 and Stage 3.5. Stage 2.5 is located between Stages 2 and 3 on the TTM. The TTM defines Stage 2 as having few thoughts, few feelings, and no behaviors and Stage 3 as having many thoughts, many feelings, some deliberate behaviors, and plans to change. We define Stage 2.5 as having more thoughts, few feelings, and non-deliberate behaviors. The second stage that we added is Stage 3.5, which is between Stages 3 and 4. The TTM defines an individual in Stage 4 as having many thoughts, many feelings, and consistent deliberate behaviors regarding their plans to change. We define Stage 3.5 many thoughts, many feelings, and inconsistent deliberate behaviors. We have removed the final stage, *Change* of the TTM from our adapted model because this stage focuses on the history of thoughts, feelings, and behaviors. Our research is focused on identifying the consistency of thoughts, feelings, and behaviors rather than the history. Therefore, respondents with consistent thoughts, feelings, and behaviors are placed in Stage 4 on the adapted model regardless of their history.

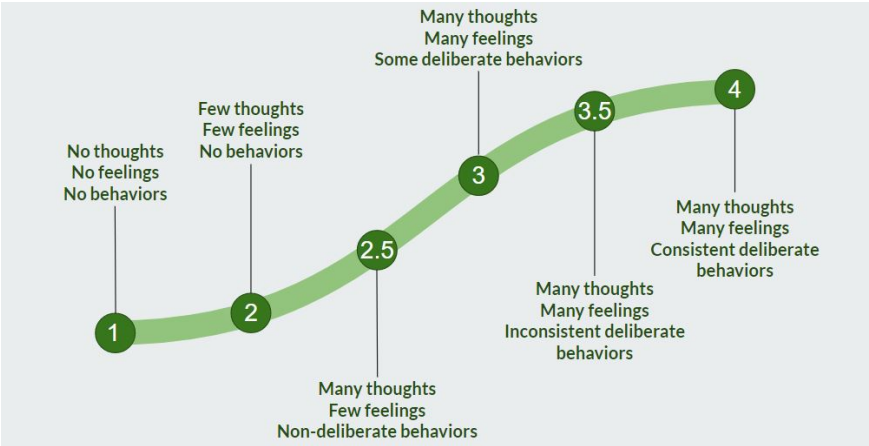

Figure 7: Adapted model of change

4.2 Weighting Questions and Answers

We developed a two-step analytical process that objectively places individuals on the adapted model. This method allows us to set specific boundaries for each stage by weighting which questions and answers are most salient in identifying each stage. The goal of this is to find the best estimation for which stage a given respondent is placed. To accomplish this, it is necessary to characterize each stage quantitatively in terms of our survey.

The first step in the analytical process is determining weights for every question in each specific stage. This is accomplished by identifying how significant each question is in determining an individual's placement in that specific stage. Questions are weighted from one (1) to five (5); one (1) meaning the question is the least salient in determining an individual's placement in that stage, and five (5) meaning the question is most salient to determining an individual's placement in that stage.

The second step is determining how an individual in that stage is expected to answer each question. For each survey question, an individual is given five multiple choice options. These options are arranged on a Likert scale where an answer of one (1) correlates to the lowest stage of change and an answer of five (5) correlates to the highest stage of change. These answers indicate the depth of the individual's thoughts, feelings, and behaviors. A four (4) point system is used to weight the answers, three (3) being the maximum and zero (0) being the minimum amount of points possible. The maximum amount of points, three (3), is given to the answer that an individual in that stage would be expected to respond. The amount of points allotted decreased as responses get farther away from the expected answer.

Table 5 illustrates the two-step process for an individual in Stage 1. This two-step process is applied for each stage and these tables are located in Appendix D.

Table 5: Stage 1 weighting

Question	**Weight**	**1**	**2**	**3**	**4**	**5**
Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)	5	3	0	0	0	0
How often do you use disposable plastics provided by the food industry? (McDonald's, Café de Coral, Pacific Coffee, restaurants...)	2	3	0	0	0	0
Have you considered decreasing your use of disposable plastics?	4	3	0	0	0	0
Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)	3	3	0	0	0	0
How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)	2	3	0	0	0	0
I am aware of the benefits of reducing my disposable plastic usage with respect to the food industry.	1	3	2	1	0	0
The environmental problems involving disposable plastics in the food industry affect me emotionally.	1	3	2	1	0	0
I feel responsible for the impact of my disposable plastics.	1	3	2	1	0	0
I believe that the surrounding environment would be better off if I didn't use disposable plastics.	1	3	2	1	0	0
I am willing to reduce my use of disposable plastics.	1	3	2	1	0	0
I would not use disposable plastics if there were alternatives available.	1	3	2	1	0	0
I have plans to reduce my use of disposable plastics.	1	3	2	1	0	0

With the help of a computer program, we calculate the maximum likelihood estimator based on the percentage of points scored in each stage, and this estimator determines the best guess for the stage of a given respondent.

4.2.1 Stage 1

The first stage directly corresponds to the *Precontemplation* stage from Prochaska's TTM. The criteria for this stage are that respondents exhibit no thoughts, feelings, or behaviors regarding their disposable plastic usage and are probably unaware that an issue regarding disposable plastics exists. In Stage 1, the most salient questions are those that determine the quantity of thoughts and feelings of the respondent. Therefore, the questions "Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)" and "Have you considered decreasing your use of disposable plastics?", have the highest weight because they identify thoughts and feelings. We established that responses above a one (1) on the Likert scale are worth zero (0) points to ensure that only those who are truly unaware would be placed into this stage.

4.2.2 Stage 2

Stage 2 directly corresponds to the *Contemplation* stage from Prochaska's TTM. The criteria for this stage are that respondents exhibit few thoughts, few feelings, but no behaviors regarding their disposable plastic usage. For Stage 2 the most salient questions are those that are carefully designed to determine if an individual has any behaviors. Therefore, the questions "Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)" and "How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)" have the highest weight. These questions are worth three points for an answer of one (1) on the Likert scale. This is because we expect a respondent in Stage 2 to have no actions. For this stage, it is also important to consider the depth of feeling that a respondent exhibits. Therefore, the feelings question, "Have you considered decreasing your use of disposable plastics?", has the second highest weight. It is worth three points for an answer of two (2) on the Likert scale. This is because an individual in Stage 2 is expected to have few feelings. The question, "Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)," identifies thoughts. For this question, respondent gets the most points for answering a two (2) or three (3) on the Likert scale. This is because we expect an individual in Stage 2 to have few thoughts and few feelings.

4.2.3 Stage 2.5

As previously noted, Stage 2.5 is one that we have created and falls between Stages 2 and 3. The criteria for Stage 2.5 are that respondents exhibit many thoughts, few feelings, and non-deliberate behaviors regarding their disposable plastic usage. These non-deliberate behaviors are defined by a lack of mindfulness, and usually done out of convenience or habit, for example carrying a reusable water bottle could done out of convenience rather than for reduction of disposable plastic usage. The most salient questions for this stage determine the deliberateness of the actions taken by the individual. The weights of the questions are the same as the previous stage, but the expected answers change to demonstrate that the individual has taken more actions. The expected answers for this stage are entirely threes (3) on the Likert

scale to demonstrate that although more actions have been taken, they are not deliberate actions.

4.2.4 Stage 3

Stage 3 corresponds to the *Preparation* stage of the TTM. The criteria for this stage are that respondents exhibit many thoughts, many feelings, some deliberate behaviors, and plans regarding decreasing their disposable plastic usage. Stage 3 focuses on the depth of the thoughts, feelings, and behaviors that are present. The questions, "Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)" and "Have you considered decreasing your use of disposable plastics?", focus on determining if the individual has any thoughts and feelings. An individual receives the most points for answering a three (3) or four (4) on the Likert scale. This is because we expect an individual in Stage 3 to have thoughts and feelings. The questions, "Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)" and "How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)", focus on determining an individual's behaviors. For these questions it is worth three points for an answer of three (3) on the Likert scale. This is because we expect an individual in Stage 3 to have few behaviors.

4.2.5 Stage 3.5

Stage 3.5, which we have created, falls between Stages 3 and 4. The criteria for Stage 3.5 are that respondents exhibit many thoughts, many feelings, and inconsistent deliberate behaviors. These deliberate behaviors may indicate that an individual is beginning to act on their plans for change, but are not consistently following that plan. The most salient questions for this stage determine the habitual depth of the actions taken by the individual. For Stage 3.5, "Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)" and "How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)," are the highest weighted questions because they focus on identifying behaviors. An individual receives three points for answering a four (4) on the Likert scale, two (2) points for answering a five (5) on the Likert scale, and one (1) point for answering a three (3) on the Likert scale. This is because an individual in Stage 3.5 is expected to have deliberate behaviors.

4.2.6 Stage 4

This stage corresponds to the *Action* stage of Prochaska's TTM. The criteria for this stage are that respondents exhibit many thoughts, many feelings, and consistent behaviors regarding their disposable plastic usage. They have a plan to reduce their disposable plastic usage, and are consistently following through with their plan. For Stage 4 the most salient questions are those that deal with behaviors. Therefore the questions, "Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)", and "How often do you

use alternatives? (Bringing your own reusable cup, straws, utensils, ...)", have the highest weight. All questions except for, "Have you considered decreasing your use of disposable plastics?", are worth three points for answering a five (5) on the Likert scale, and two points for answering a four (4) on the Likert scale, and zero points for all other answers. An individual in Stage 4 is expected to have strong thoughts and feelings, as well as consistent behaviors.

4.3 Analysis

The analysis of our survey data indicates that the majority of respondents are placed in either Stage 2.5 or Stage 3, with the remaining population placed across Stages 2, 3.5, and 4, and zero respondents placed in Stage 1. Figure 8 illustrates the distribution of survey participants across the previously defined stages, with 64% of the total population placed into Stage 2.5 and Stage 3. This data indicates that our survey population is aware that disposable plastic usage is a problem and are taking actions to reduce their usage, but are not deliberate or consistent in their actions.

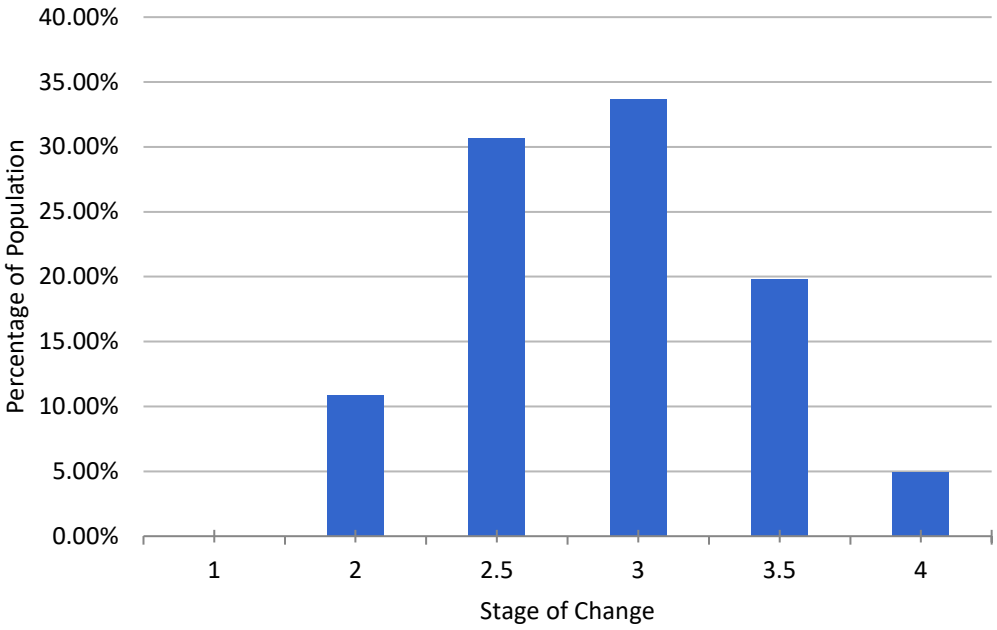

Figure 8: Percentage of population in each stage

We have also analyzed the data regarding where respondents are placed on the model based on their age group. These results are illustrated in Figure 9. 92.3% of respondents in the 18-25 age group and 75% of the 26-40 age group place in Stage 3 or in previous stages. Therefore, only 7.7% of the 18-25 age group and 25% of the 26-40 age group to be placed in Stages 3.5 and 4. This trend of stage increasing with age continues into the 40-65 age group as 36% of this group are placed in Stages 3.5 and 4. Respondents in the 65+ age group are placed only in Stages 3.5 and 4. However, a limitation is that we were only able to survey five (5) respondents in this age range.

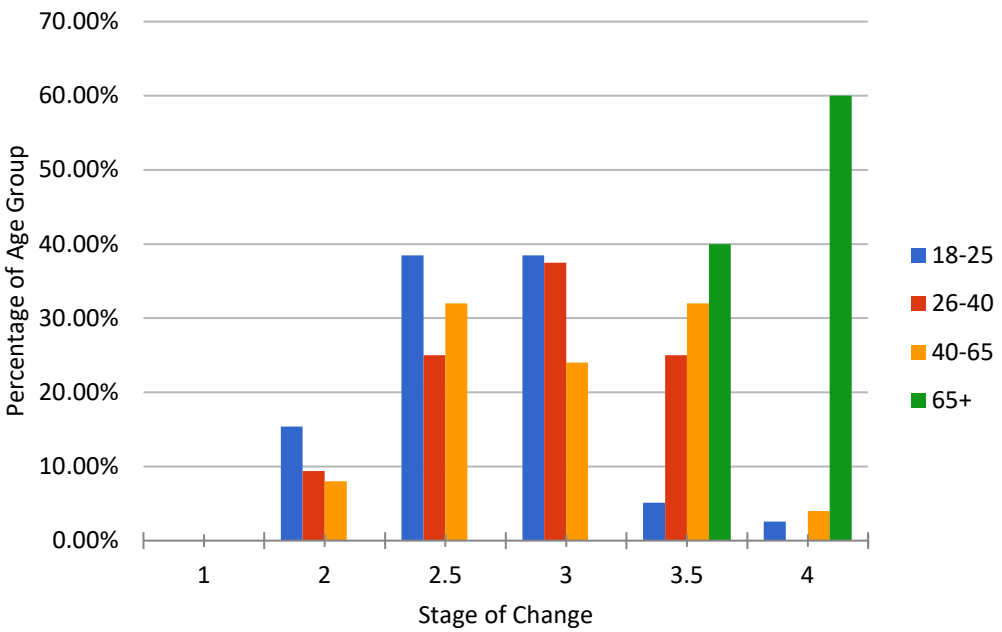

Figure 9: Percentage of Population in Each Stage by Age

4.4 Limitations of the Survey

We believe that the following limitations need to be recognized in order to properly interpret our study. The first limitation is that we recognize that a language barrier exists and could have impacted the demographic that our survey reached, for example being approached by English speaking students may deter a potential respondent from participating if they speak little or no English at all. A second limitation is that we chose the areas to survey based on recommendations from our sponsor which could have also impacted the respondent demographic. A third limitation is that it is difficult for us to know if translations of questions were exact and if nuance was understood. A fourth limitation is that a large education bias appeared in our survey, as 88.1% of participants reported being college educated. This is not an accurate representation of the general population of Hong Kong. A fifth limitation of our survey is that there are only five (5) respondents over the age of 65. This represents only 4.9% of the survey population. A sixth limitation is that a self-reported survey does not guarantee the objectivity of respondents' responses.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

Based on surveying and archival research, we have found that the residents of Hong Kong are aware of the issue of disposable plastics in the food industry and the majority of people are ready to change their behaviors and decrease their utilization of these items. This section discusses the key findings and conclusions of our research as well as provides recommendations on how to move Hong Kong residents further along in the process of change.

5.1 Conclusions

Through the development of a two-step analytical process, we found that 30.69% of our survey population are placed in Stage 2.5 and 33.66% in Stage 3. Individuals placed in Stage 2.5 have few non-deliberate behaviors while those in Stage 3 have some inconsistent deliberate behaviors regarding disposable plastic usage. Individuals in Stage 2.5 may be taking these actions due to convenience rather than with the intention of reducing their disposable plastic usage, for example carrying a reusable water bottle for the convenience of not having to purchase disposable plastic water bottles. Individuals in Stage 3 are deliberately taking some action to reduce their disposable plastic usage, for example declining plastic straws when offered in order to create less plastic waste. From this, we conclude that Hong Kong residents are aware of the problems caused by disposable plastics in the food industry, realize the benefits of changing, and that they are ready to change. We have also concluded that because Hong Kong residents are already aware, an intervention to educate residents is not necessary.

We have also examined our survey results by analyzing where individuals are placed on the model based on their age group. From this, we see a trend that individuals over the age of 40 are further along in the process of change. We assume that this is because individuals below the age of 40 value convenience over the issue of disposable plastics in the food industry. We conclude that in order to move the younger age groups further through change, their quantity of thoughts and feelings regarding this issue need to increase.

Our survey also asked respondents about government and corporate involvement and responsibility for decreasing the usage of disposable plastics in the food industry. The survey data indicates that 94% of respondents agreed or strongly agreed that they would not use disposable plastics if alternatives were available. In addition, 78% of respondents agreed or strongly agreed that they would respond positively to government regulation around disposable plastics in the food industry. From this, we conclude that corporations and the government should be informed on consumers' readiness to change and how they can contribute to this change.

5.2 Recommendations

As a result of our conclusions and analysis, we have provided recommendations on how to reduce the utilization of disposable plastics in the food industry. These recommendations deal with presenting data, further research, and moving residents further along in the process of change.

We recommend that Friends of the Earth consider sharing our project data on residents' willingness to change regarding disposable plastic usage in the food industry food corporations.

The majority of our survey population is placed in Stages 2.5 and 3. This indicates that the majority of people have thoughts, feelings, and non-deliberate or inconsistent deliberate behaviors about reducing their disposable plastic usage. We believe that food corporations and and other influential organizations should be informed that consumers are ready to change their behaviors surrounding disposable plastic items in the food industry. We have created a short document, that can be seen in Appendix F with data showing that people are ready and willing to change. This document also highlights alternatives that survey participants indicated they would be most likely to use. The presentation and delivery of these data would require contacts in the food industry. We recommend that Friends of the Earth deliver this document by utilizing past projects, research, and partnerships, and by reaching out to organizations similar to themselves in order to acquire these contacts.

We recommend that Friends of the Earth consider utilizing the science of behavioral change, specifically Prochaska's Transtheoretical Model of Change (TTM) and the modified TTM, to design and implement intervention modalities.

Our research has utilized the theory and practice of Value Based Behavior, Developmental Psychology, Situational Leadership, Prochaska's Transtheoretical Model of Change, and our adapted model of change. This research is based on the belief that change is a function of time, experience, and process. For this reason, there is no definitive way to influence behavior and change cannot be accomplished through a single intervention. We have discovered that it is necessary to identify the existing thoughts, feelings, and behaviors before determining the most effective process for influencing behavior change. We have used these tested principles of psychology to create an example video that is intended to influence an individual to move from Stage 2 to Stage 2.5 on the adapted model of change. A detailed storyboard of this video is provided in Appendix G. This video is targeted towards Stage 2 individuals, meaning individuals that have some thoughts, some feelings, but no behaviors. The intent of the video is to move these individuals to Stage 2.5, meaning that after watching this video they will have many thoughts, few feelings, and possible non-deliberate behaviors. From this, it becomes clear that in order to move an individual from Stage 2.5 to Stage 3 an intervention with different psychological and behavioral focuses would need to be designed. We recommend that specific interventions be designed for every stage on the adapted model in order to effectively influence behavior change.

We recommend that Friends of the Earth consider researching, designing, and implementing creative process-oriented interventions.

The TTM and the adapted model prove that change is a process and cannot often be accomplished through a single intervention. Possible process-oriented interventions include: mobile applications, multi-stage educational programs, and ad campaigns.

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APPENDIX A: GEOGRAPHY AND HISTORY OF HONG KONG

Hong Kong is a territory off the coast of south-eastern China. Due to its southern location, the territory has a subtropical climate (Leung, 2017). Hong Kong consists of Hong Kong Island, Kowloon, and the New Territories, covering an approximate area of 1,104 km2 ("Hong Kong in Figures: Geography and Climate," n.d.). The landscape is extremely mountainous with its highest peak being Tai Mo Shan, and the region has notable harbors including Victoria Harbour (Leung, 2017). According to the 2016 census, Hong Kong has a population of 7,116,829 and is made up of multiple ethnic groups including but not limited to: Chinese, Filipino, Indonesian, and White ("Main Tables," 2017).

The history of Hong Kong can be divided into three major periods: Pre-British rule, British rule, and Post-British rule. What is now known as Hong Kong was originally made up of aboriginal fishing colonies that were absorbed into China in 50BC ("History", n.d.). European nations began to trade with the island in the 1500s, and in the 1800s the British began to trade Opium through its ports ("History", n.d.). From 1840 to 1842 the Opium Wars took place ending in China ceding Hong Kong and its neighboring islands to Britain ("History," n.d.). Under British Rule, Hong Kong became one of the world's major economies and financial centers ("History," n.d.). In 1997 Hong Kong was returned to China under the Sino-British Joint Declaration and became the Hong Kong Special Administrative Region (SAR) ("History," n.d.). Recently the Hong Kong SAR celebrated its 20th anniversary and will have events throughout the year to celebrate the return of Hong Kong to mainland China ("Hong Kong July 1st Celebrations: The 20th Anniversary of the Establishment of the Hong Kong SAR," n.d.).

APPENDIX B: FRIENDS OF THE EARTH HONG KONG

Friends of the Earth Hong Kong is a private, non-profit, non-governmental organization. Their funding is provided through group member contributions and donations from governments and foundations. They are committed to protecting the environment in Hong Kong and neighboring areas through their mission of promoting the government, enterprises, and society, as well as building sustainable, rational, and comprehensive environmental policies, business practices, and living conditions (Friends of the Earth HK, n.d.).

Friends of the Earth HK (n.d.) is consists of three divisions of authority and six divisions of labor. The three authority divisions consist of the Board of Directors, the Chief Executive Officer, and the Executive Committee which oversee the six divisions of labor (Friends of the Earth HK, n.d.).

Each labor division of Friends of the Earth HK has various responsibilities. The first division is the Institutional Services and Controls, which oversees the administrative, finance, human resources, and the information technology departments (Friends of the Earth HK, n.d.). Next, Friends of the Earth HK (n.d.) describes the Corporate Social Responsibility division is responsible for consultation, practice, environmental impact assessments, waste resource development, and carbon and energy management. The Scientific Research and Policy division is focused on traffic flow, air, greener economy and industry, and community planting and greening (Friends of the Earth HK, n.d.). The responsibilities of the Government Initiative Promotion and Client Services division are described by Friends of the Earth HK (n.d.) as working with government initiatives and member, volunteer, or sponsoring clients who may serve as partnering organizations. The Community Education division works with primary, middle, high schools, and colleges as well as homes, to host activities to educate the community on their initiatives (Friends of the Earth HK, n.d.). Lastly, the China division works with tree planting and conservation, educational activity, and water (Friends of the Earth HK, n.d.).

There are approximately 30 employees working at Friends of the Earth HK. The employees belong to the labor divisions, which have approximately four to six employees per division.

APPENDIX C: 即棄塑膠問卷調 (DISPOSABLE PLASTICS SURVEY)

此研究項目的有關數據將會被發佈。但是，本調查不會收集姓名或其它個人資料。問卷調查需時約五分鐘。請問閣下有沒有任何問題？**請填寫以下選項。**

This is a research project, and the data will be published. However, no individual names or identifiable information will be published. will be This survey should take 5 minutes. Do you have any questions before the study begins? Please fill out the options below.

* Required

1. 性別 (What is your gender?) * Mark only one oval.
    - o 男 (Male)
    - o 女 (Female)
    - o 不想回答 (Prefer not to answer)
2. 請問閣下的居住地點是？ (Where do you reside?) * Mark only one oval.
    - o 香港島 (Hong Kong Island)
    - o 九龍 (Kowloon)
    - o 新界 (New Territories)
    - o 離島 (Outlying Islands) Other:
3. 請問閣下的年齡是？ (What is your age?) * Mark only one oval.
    - o <18
    - o 18-25
    - o 26-40
    - o 40-65
    - o >65
4. 請問閣下的最高學歷程度是？ (What is the highest level of education you have attained?) * Mark only one oval.
    - o 小學或以下 (Primary School or below)

- o 中學 (中一至中三) (Secondary School F.1 - F.3)
- o 中學 (中四至中六) (Secondary School F.4 - F.6)
- o 大專或以上 (College, University, or Above)

5. 請問閣下的每月收入是？ (What is your monthly income?) * Mark only one oval.
   - o < $10,000
   - o $10,000-$20,000
   - o $20,000-$30,000
   - o $30,000-$40,000
   - o > $40,000
   - o 不想回答 (Prefer not to answer)

即棄塑膠一般在其被棄置/回收前只會被使用一次，如塑膠袋、飲管、攪拌棒、水樽及外賣容器等。我們集中調查市民用膳時即棄塑膠的使用。

Disposable plastics are used only once before they are thrown away or recycled. These items are things like plastic bags, straws, coffee stirrers, soda and water bottles, and take away containers. We are focused on the use of disposable plastics in the food industry.

6. 請問閣下有否曾經反思作為消費者使用即棄塑膠產品的習慣? (食物包裝、膠袋、外賣杯、外賣杯蓋、飲管) (Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)) *Mark only one oval.
   - o 從不(Never)
   - o 甚少(Rarely)
   - o 偶爾(Occasionally)
   - o 經常(Frequently)
   - o 頻繁(Repeatedly)

7. 請問閣下使用食肆提供的即棄塑膠產品的頻密程度？ (麥當勞、大家樂、太平洋咖啡、餐廳…) (How often do you use disposable plastics provided by the food industry? (McDonald's, Café de Coral, Pacific Coffee, restaurants...)) * Mark only one oval.

- o 從不(Never)
- o 甚少(Rarely)
- o 偶爾(Occasionally)
- o 經常(Frequently)
- o 頻繁(Repeatedly)

8. 請問閣下有否考慮過減少使用即棄塑膠產品? (Have you considered decreasing your use of disposable plastics?) *Mark only one oval.
   - o 從不(Never)
   - o 甚少(Rarely)
   - o 偶爾(Occasionally)
   - o 經常(Frequently)
   - o 頻繁(Repeatedly)
9. 請問閣下有否採取任何減少使用即棄塑膠產品的措施? (自備可循環再用杯或飲管、避免使用即棄塑膠產品及光顧使用即棄塑膠產品的食肆…) (Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)) * Mark only one oval.
   - o 從不(Never)
   - o 甚少(Rarely)
   - o 偶爾(Occasionally)
   - o 經常(Frequently)
   - o 頻繁(Repeatedly)
10. 你使用其他替代產品的頻密程度? (可循環再用飲品杯、飲管、餐具…) (How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)) *Mark only one oval.
    - o 從不(Never)

- 甚少(Rarely)
- 偶爾(Occasionally)
- 經常(Frequently)
- 頻繁(Repeatedly)

11. 請問閣下認為誰該為減用即棄塑膠產品負責? (Who do you believe should be responsible for reducing the use of disposable plastics?) *Check all that apply.
    - 商戶 (Consumers)
    - 消費者 (Corporations)
    - 政 府 (Government)
    - Other:
12. 請問閣下會否積極響應政府有關即棄塑膠產品的規例? (Would you respond positively to government regulation of disposable plastics?) *Mark only one oval.
    - 非常不同意 (Strongly Disagree)
    - 不同意(Disagree)
    - 中立 (Neutral)
    - 同意(Agree)
    - 非常同意 (Strongly Agree)
13. 請問閣下會否積極響應推行減用即棄塑膠產品的食肆? Would you respond positively to corporations implementing policies aimed at reducing the usage of disposable plastics? *Mark only one oval.
    - 非常不同意 (Strongly Disagree)
    - 不同意(Disagree)
    - 中立 (Neutral)
    - 同意(Agree)
    - 非常同意 (Strongly Agree)

14. **我意識到由飲食業**產生的即棄塑膠產品所帶來的影響。 (I am aware of the benefits of reducing my disposable plastic usage with respect to the food industry.) *Mark only one oval.

    - o **非常不同意** (Strongly Disagree)
    - o **不同意**(Disagree)
    - o **中立** (Neutral)
    - o **同意**(Agree)
    - o **非常同意** (Strongly Agree)

15. **飲食業的即棄塑膠**產品所衍生的環境問題對我的情緒有影響。 (The environmental problems involving disposable plastics in the food industry affect me emotionally.) *Mark only one oval.

    - o **非常不同意** (Strongly Disagree)
    - o **不同意**(Disagree)
    - o **中立** (Neutral)
    - o **同意**(Agree)
    - o **非常同意** (Strongly Agree)

16. **我覺得我應為使用即棄塑膠**產品所帶來的影響負上責任。 (I feel responsible for the impact of my disposable plastics.) *Mark only one oval.

    - o **非常不同意** (Strongly Disagree)
    - o **不同意**(Disagree)
    - o **中立** (Neutral)
    - o **同意**(Agree)
    - o **非常同意** (Strongly Agree)

17. **我相信若我停止使用即棄塑膠**產品,**周圍環境會變得更好**。 (I believe that the surrounding environment would be better off if I didn't use disposable plastics.) *Mark only one oval.

- o 非常不同意 (Strongly Disagree)
- o 不同意(Disagree)
- o 中立 (Neutral)
- o 同意(Agree)
- o 非常同意 (Strongly Agree)

18. 我願意減少使用即棄塑膠產品。 (I am willing to reduce my use of disposable plastics.) * Mark only one oval.
    - o 非常不同意 (Strongly Disagree)
    - o 不同意(Disagree)
    - o 中立 (Neutral)
    - o 同意(Agree)
    - o 非常同意 (Strongly Agree)
19. 我有朋友已經開始減少使用即棄塑膠產品。 (I have peers who have reduced their disposable plastic use.) *Mark only one oval.
    - o 非常不同意 (Strongly Disagree)
    - o 不同意(Disagree)
    - o 中立 (Neutral)
    - o 同意(Agree)
    - o 非常同意 (Strongly Agree)
20. 如有其他選擇, 我不會使用即棄塑膠產品。 (I would not use disposable plastics if there were alternatives available.) *Mark only one oval.
    - o 非常不同意 (Strongly Disagree)
    - o 不同意(Disagree)

- o 中立 (Neutral)
- o 同意(Agree)
- o 非常同意 (Strongly Agree)

21. 我已有計劃減少使用即棄塑膠產品。 (I have plans to reduce my use of disposable plastics.) * Mark only one oval.
    - o 非常不同意 (Strongly Disagree)
    - o 不同意(Disagree)
    - o 中立 (Neutral)
    - o 同意(Agree)
    - o 非常同意 (Strongly Agree)

22. 請問閣下對以下哪些減少使用即棄塑膠產品的方法感興趣? (What steps to reduce your disposable plastic usage would you be interested in?) *Check all that apply.
    - o 可循環再用飲品杯 (Reusable cup)
    - o 玻璃/金屬/竹飲管 (Glass/Metal/Bamboo Straw)
    - o 可循環再用餐具 (Reusable Utensils)
    - o 企業提供誘因鼓勵使用替代品 (Businesses providing incentives for bringing alternatives)
    - o 拒絕日常生活中提供的即棄塑膠產品 (Declining regularly provided disposable plastic items)
    - o 自備外買盒 (Bringing your own takeout containers)
    - o 以上皆非 (None)
    - o Other:

APPENDIX D: STAGE WEIGHT TABLES

Table 6: Stage 1 weighting

Question	**Weight**	**1**	**2**	**3**	**4**	**5**
Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)	5	3	0	0	0	0
How often do you use disposable plastics provided by the food industry? (McDonald's, Café de Coral, Pacific Coffee, restaurants...)	2	3	0	0	0	0
Have you considered decreasing your use of disposable plastics?	4	3	0	0	0	0
Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)	3	3	0	0	0	0
How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)	2	3	0	0	0	0
I am aware of the benefits of reducing my disposable plastic usage with respect to the food industry.	1	3	2	1	0	0
The environmental problems involving disposable plastics in the food industry affect me emotionally.	1	3	2	1	0	0
I feel responsible for the impact of my disposable plastics.	1	3	2	1	0	0
I believe that the surrounding environment would be better off if I didn’t use disposable plastics.	1	3	2	1	0	0
I am willing to reduce my use of disposable plastics.	1	3	2	1	0	0
I would not use disposable plastics if there were alternatives available.	1	3	2	1	0	0
I have plans to reduce my use of disposable plastics.	1	3	2	1	0	0

Table 7: Stage 2 weighting

Question	**Weight**	**1**	**2**	**3**	**4**	**5**
Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)	5	0	3	2	1	1
How often do you use disposable plastics provided by the food industry? (McDonald's, Café de Coral, Pacific Coffee, restaurants...)	2	0	3	2	1	1
Have you considered decreasing your use of disposable plastics?	4	1	2	3	2	1
Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)	5	3	2	0	0	0
How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)	5	3	2	0	0	0
I am aware of the benefits of reducing my disposable plastic usage with respect to the food industry.	1	0	2	3	2	1
The environmental problems involving disposable plastics in the food industry affect me emotionally.	1	0	2	3	2	1
I feel responsible for the impact of my disposable plastics.	1	0	2	3	2	1
I believe that the surrounding environment would be better off if I didn’t use disposable plastics.	1	0	2	3	2	1
I am willing to reduce my use of disposable plastics.	1	0	2	3	2	1
I would not use disposable plastics if there were alternatives available.	1	0	2	3	2	1
I have plans to reduce my use of disposable plastics.	1	0	2	3	2	1

Table 8: Stage 2.5 weighting

Question	**Weight**	**1**	**2**	**3**	**4**	**5**
Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)	5	0	1	3	2	1
How often do you use disposable plastics provided by the food industry? (McDonald's, Café de Coral, Pacific Coffee, restaurants...)	2	0	1	3	1	1
Have you considered decreasing your use of disposable plastics?	4	0	1	3	2	1
Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)	5	0	2	3	1	0
How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)	5	0	3	3	1	0
I am aware of the benefits of reducing my disposable plastic usage with respect to the food industry.	1	0	2	3	2	1
The environmental problems involving disposable plastics in the food industry affect me emotionally.	1	0	2	3	2	1
I feel responsible for the impact of my disposable plastics.	1	0	2	3	2	1
I believe that the surrounding environment would be better off if I didn’t use disposable plastics.	1	0	2	3	2	1
I am willing to reduce my use of disposable plastics.	1	0	2	3	2	1
I would not use disposable plastics if there were alternatives available.	1	0	2	3	2	1
I have plans to reduce my use of disposable plastics.	1	0	2	3	2	1

Table 9: Stage 3 weighting

Question	**Weight**	**1**	**2**	**3**	**4**	**5**
Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)	5	0	1	3	3	1
How often do you use disposable plastics provided by the food industry? (McDonald's, Café de Coral, Pacific Coffee, restaurants...)	3	0	1	2	3	1
Have you considered decreasing your use of disposable plastics?	5	0	0	3	2	1
Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)	5	0	0	3	2	1
How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)	5	0	1	3	2	1
I am aware of the benefits of reducing my disposable plastic usage with respect to the food industry.	1	0	0	3	3	1
The environmental problems involving disposable plastics in the food industry affect me emotionally.	1	0	0	3	3	1
I feel responsible for the impact of my disposable plastics.	1	0	0	3	3	1
I believe that the surrounding environment would be better off if I didn’t use disposable plastics.	1	0	0	3	3	1
I am willing to reduce my use of disposable plastics.	1	0	0	3	3	1
I would not use disposable plastics if there were alternatives available.	1	0	0	3	3	1
I have plans to reduce my use of disposable plastics.	1	0	0	3	3	1

Table 10: Stage 3.5 weighting

Question	**Weight**	**1**	**2**	**3**	**4**	**5**
Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)	4	0	0	1	3	2
How often do you use disposable plastics provided by the food industry? (McDonald's, Café de Coral, Pacific Coffee, restaurants...)	3	0	0	2	3	2
Have you considered decreasing your use of disposable plastics?	3	0	1	2	3	2
Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)	5	0	0	1	3	2
How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)	5	0	0	1	3	2
I am aware of the benefits of reducing my disposable plastic usage with respect to the food industry.	1	0	0	1	2	3
The environmental problems involving disposable plastics in the food industry affect me emotionally.	1	0	0	1	2	3
I feel responsible for the impact of my disposable plastics.	1	0	0	1	2	3
I believe that the surrounding environment would be better off if I didn’t use disposable plastics.	1	0	0	1	2	3
I am willing to reduce my use of disposable plastics.	1	0	0	1	2	3
I would not use disposable plastics if there were alternatives available.	1	0	0	1	2	3
I have plans to reduce my use of disposable plastics.	1	0	0	1	2	3

Table 11: Stage 4 weighting

Question	**Weight**	**1**	**2**	**3**	**4**	**5**
Have you thought about your use of disposable plastics as a consumer in the food industry? (food packaging, bags, cups, lids, straws)	4	0	0	0	2	3
How often do you use disposable plastics provided by the food industry? (McDonald's, Café de Coral, Pacific Coffee, restaurants...)	2	0	0	0	2	3
Have you considered decreasing your use of disposable plastics?	3	0	0	1	2	3
Have you taken steps to reduce your use of disposable plastics? (Bringing your own reusable cup, using reusable straws, avoiding disposable plastic products and places that use disposable plastics...)	5	0	0	0	2	3
How often do you use alternatives? (Bringing your own reusable cup, straws, utensils, ...)	5	0	0	0	2	3
I am aware of the benefits of reducing my disposable plastic usage with respect to the food industry.	1	0	0	0	2	3
The environmental problems involving disposable plastics in the food industry affect me emotionally.	1	0	0	0	2	3
I feel responsible for the impact of my disposable plastics.	1	0	0	0	2	3
I believe that the surrounding environment would be better off if I didn’t use disposable plastics.	1	0	0	0	2	3
I am willing to reduce my use of disposable plastics.	1	0	0	0	2	3
I would not use disposable plastics if there were alternatives available.	1	0	0	0	2	3
I have plans to reduce my use of disposable plastics.	1	0	0	0	2	3

APPENDIX E: ADDITIONAL GRAPHS

This appendix contains graphs from our survey data. The following graphs provide further information on how different demographics responded to questions, as well as where different demographics placed on the stages of change.

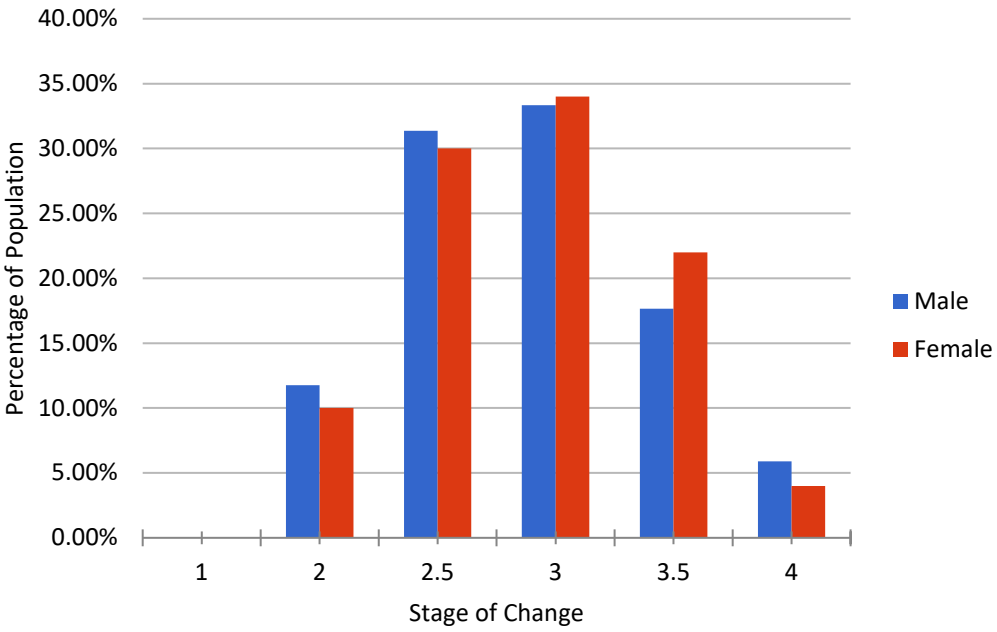

Figure 10: Percentage of population in each stage of change by gender

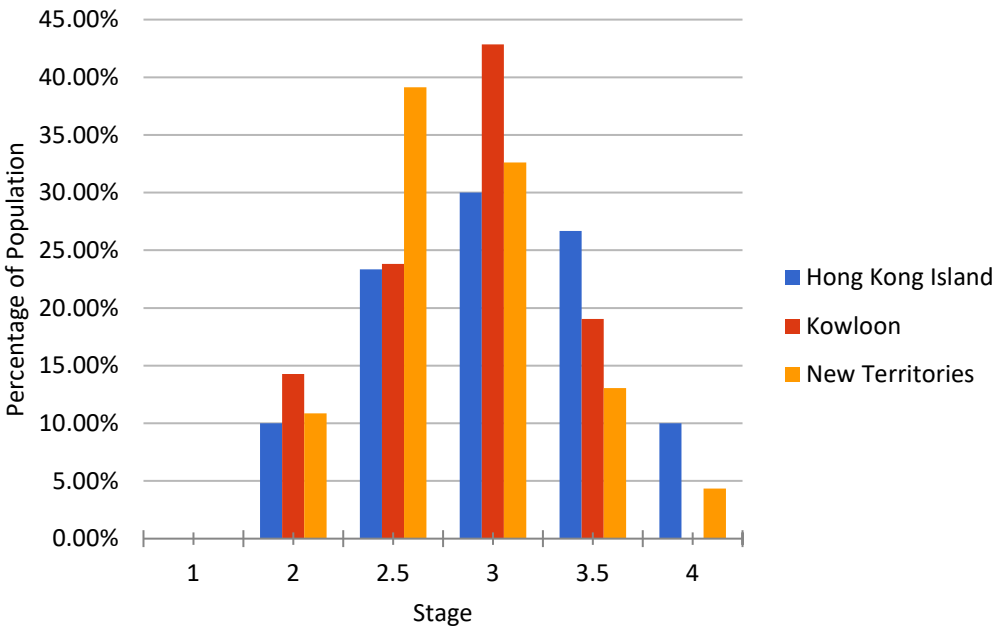

Figure 11: Percentage of population in each stage of change by residency

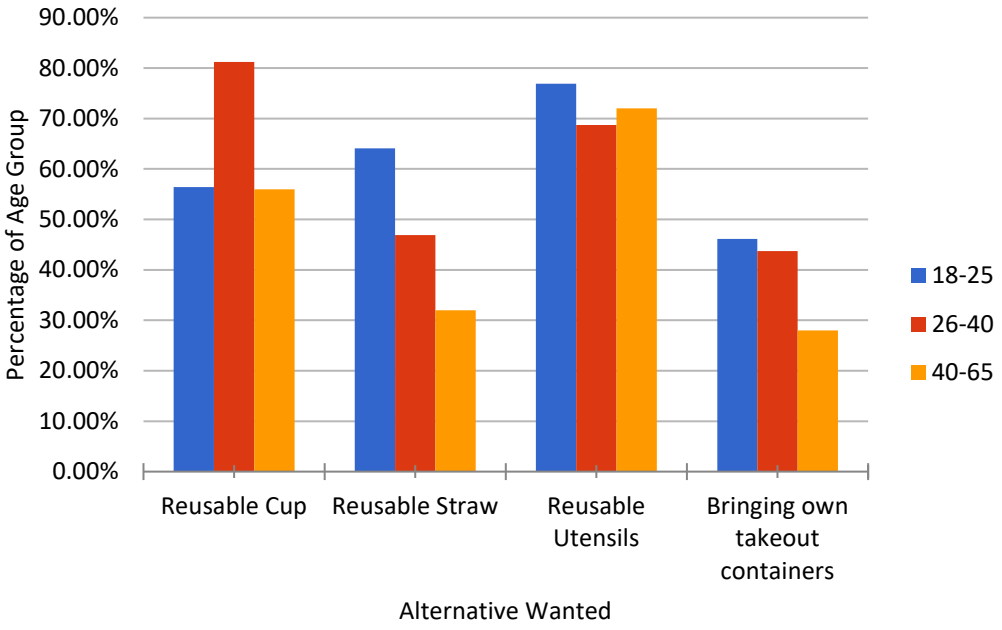

Figure 12: Alternatives to disposable plastic wanted by age

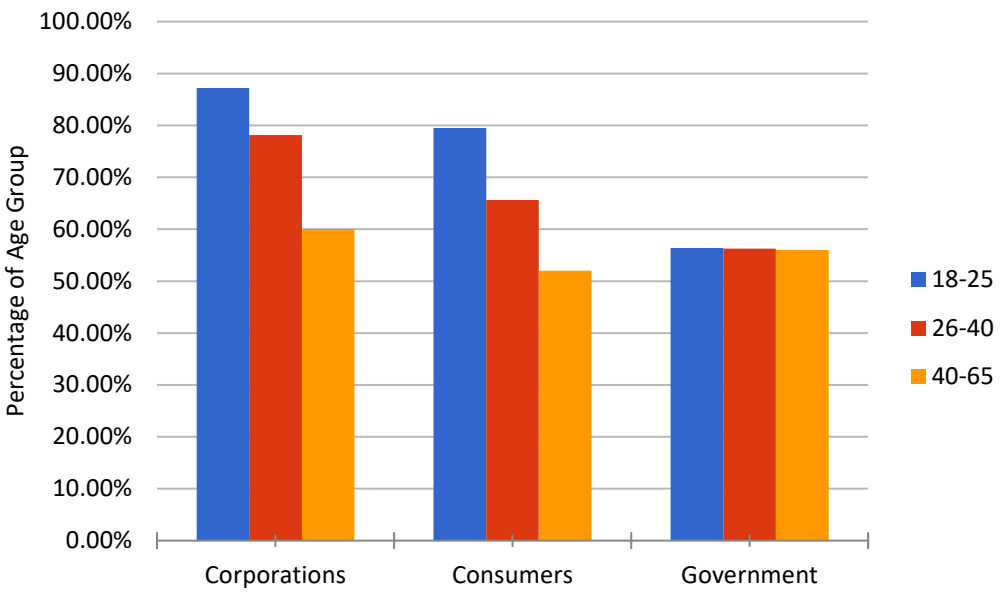

Figure 13: Responsibility for disposable plastic reduction by age

APPENDIX F: OVERVIEW OF RESULTS FOR WIDER DISTRIBUTION

This appendix contains graphs from our survey data. The following graphs display that respondents are ready and willing to stop utilizing disposable plastic. Each graph is prefaced by a brief description.

Friends of the Earth Hong Kong's Suggestions to Reduce Disposable Plastic Waste

This document was created by a group of university students from the United States who have worked with Friends of the Earth Hong Kong to study residents' behaviors surrounding disposable plastic usage in the food industry. For this study disposable plastic items are defined as food packaging, bags, cups, lids and straws. This data is based on a survey of 101 Hong Kong residents.

The results show that all respondents are aware of the problems regarding disposable plastics in the food industry. The majority of respondents are willing and ready to change their behavior to reduce their use, but have not yet taken significant steps towards change. The following data indicates that consumers look towards corporations and the government to initiate change, that individuals are open to change, and some alternatives of interest.

The graph below in Figure A displays who respondents believe should be responsible for reducing the use of disposable plastics. Respondents were able to choose multiple or no answers. Figure A illustrates that over 75% of consumers think that corporations should be responsible for reducing the use of disposable plastics. From this, it can be concluded that consumers are looking to corporations to make a change.

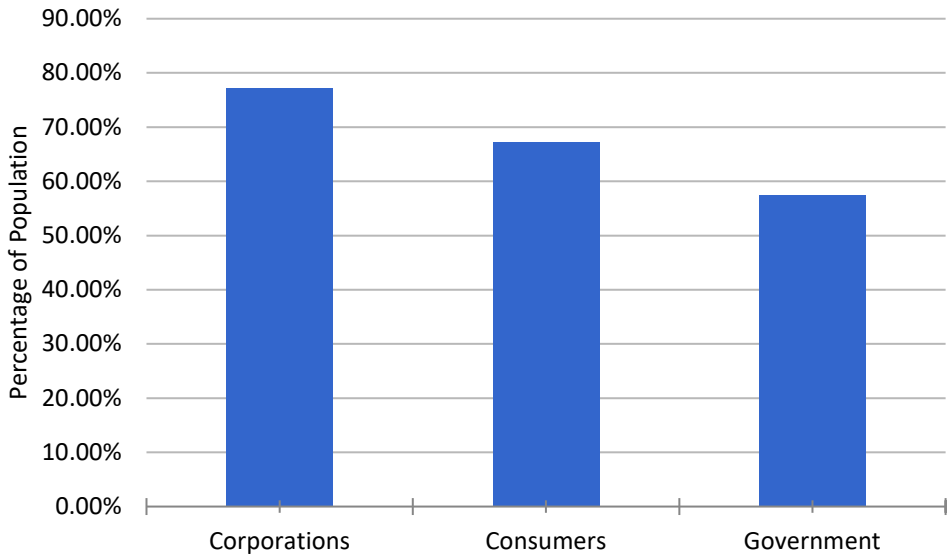

Figure A: Responsibility for disposable plastic reduction

This data was further sorted by age group. Figure B displays that the 18-25 age group holds both corporations and consumers as highly responsible.

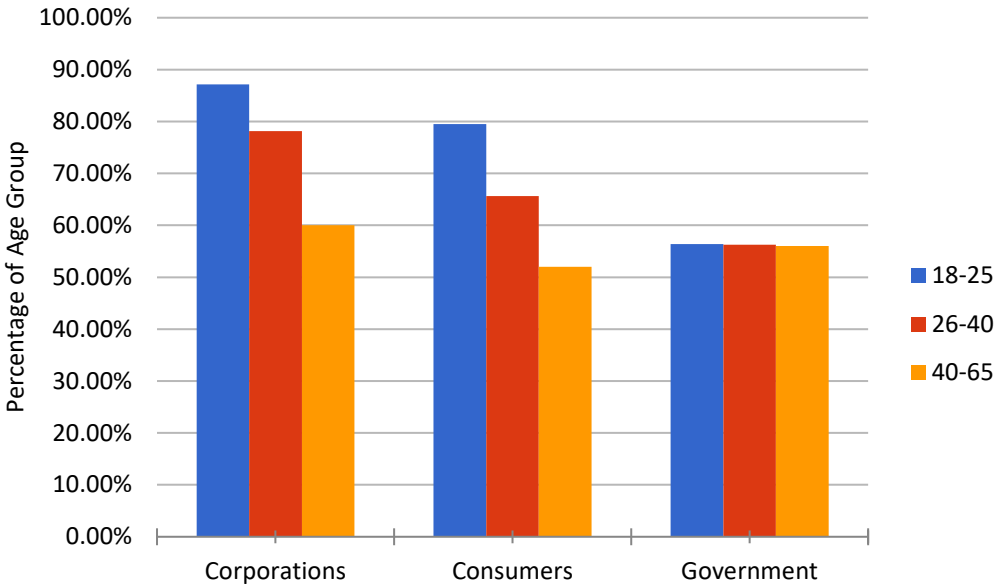

Figure B: Responsibility for disposable plastic reduction by age

Data was also collected on interest in alternatives to disposable plastics. Figure C illustrates that 94% of respondents either agree or strongly agree that they would not use disposable plastics if alternatives were available.

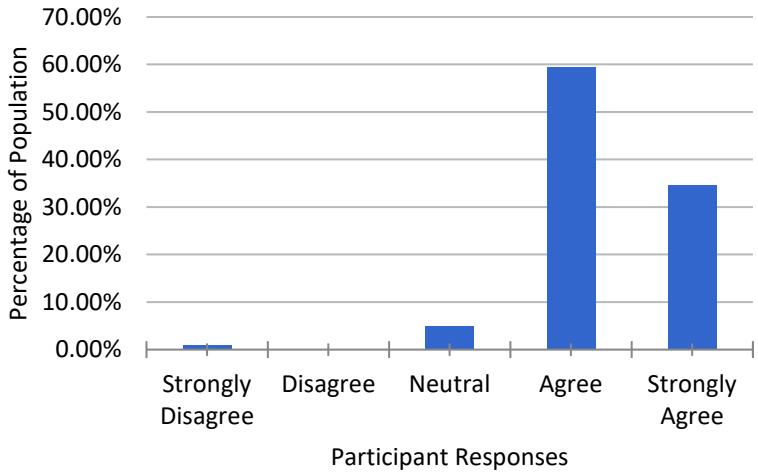

Figure C: "I would not use disposable plastics if there were alternatives available."

Figure D, illustrates what specific alternatives respondents are interested in. The results show that people are most interested in reusable utensils, and then reusable cups and straws, and finally bringing their own takeout containers.

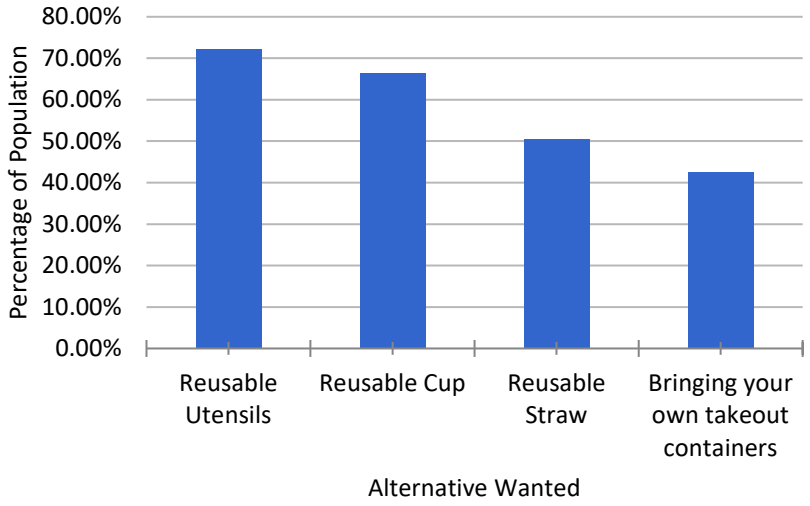

Figure D: Percentage of alternatives wanted

From this data, it can be concluded that the residents of Hong Kong are ready and willing to change. Individuals are looking towards corporations to take action to reduce disposable plastic, and are interested in multiple types of alternatives.

APPENDIX G: VIDEO STORYBOARD

Following the Situational Leadership Model recommendation, the video is set up as "telling." Definitions of the Processes of Change and "directing" can all be found in the Psychology of Change section of the background.

Table 12: Video breakdown

Timestamp	Person	Reasoning	Processes of Change
00:00	Dana Winograd	Appeals to thoughts by setting up the problem of waste management and associates the problem with Hong Kong.	Consciousness Raising
00:29	Maegan Cowan	Creates more thoughts by reinforcing the problem of waste and need for reduction. Begins to appeal to feelings by tying this problem directly to their home (making this a personal problem).	Consciousness Raising Environmental Reevaluation
00:43	Maegan Cowan	Appeals to feelings by providing an understanding explanation of how people value convenience because it is a "fast moving city". Appeals to feelings with encouragement that changing is not as difficult once you as it may seem.	Consciousness Raising
01:09	Dr. Merrin Pearse	Appeals to feelings by talking about how disposable plastic use hurts the environment and humanity	Dramatic Relief Environmental Reevaluation
01:53	Doug Woodring	Creates more thoughts by challenging people to think about how much plastic they use, by saying "store your plastic waste for one week, and see what you've accumulated because a lot of people will be very shocked at how much they accumulate". May inspire non-deliberate behaviors just by having considered this.	Dramatic Relief
02:05	Dana Winograd	Creates positive feelings by reinforcing that the individual can drive change and inspire others by just taking small actions. Appeals to thought by talking about feasibility and how it is very easy to change, not impossible.	Social Liberation

02:37	Dr. Merrin Pearse	Creates more thoughts by reminding people to question the necessity of their plastic usage.	Consciousness Raising
02:59	Dr. Merrin Pearse	Appeals to feelings by highlighting wastefulness by highlighting the huge amount of disposable plastic we are given and don't use.	Consciousness Raising
03:11	Maegan Cowan	Appeals to feelings by giving a personal example of reducing disposable plastic usage to help inspire others.	Self-Liberation
03:29	Dana Winograd	May inspire non-deliberate behaviors by giving visual examples of alternatives. Appeals to more feelings by reinforcing that an individual's actions can inspire others. Appeals to thoughts by restating how easy it is to replace disposable plastic items.	Self-Liberation
04:33	Doug Woodring	May inspire non-deliberate behaviors by talking about avoiding disposable plastics where not necessary. Highlights avoiding restaurants/food corporations that use disposable plastics as a reduction tactic.	Social Liberation
04:48	Dr. Merrin Pearse	Restating the point above.	Social Liberation
05:01	Doug Woodring	Appeals to thoughts and may initiate some behaviors by discussing reaching out to corporations using social media to help create change.	Social Liberation
05:19	Dr. Merrin Pearse	Reinforcing use of social media to create change.	Social Liberation
05:25	Dr. Merrin Pearse	Appeals to thoughts in summary point of restating to look where plastic is used and doesn't need to be. May inspire non-deliberate behaviors by ending on the note to choose the alternatives.	Social Liberation