UNIVERSITÉ DU QUÉBEC À MONTRÉAL

# THREE ESSAYS ON THE ATTITUDE-INTENTION-BEHAVIOR GAP IN SUSTAINABLE CONSUMPTION

THESIS

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GHINA EL HAFFAR

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# TROIS ESSAIS SUR L'ÉCART ENTRE ATTITUDE, INTENTION ET COMPORTEMENT DE CONSOMMATION ÉCORESPONSABLE

THÈSE

PRÉSENTÉE

COMME EXIGENCE PARTIELLE

DU PROGRAMME DE DOCTORAT EN ADMINISTRATION

PAR

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*'If suffer we must,*
*let's suffer on the heights.'*
*Victor Hugo*

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# ABSTRACT

This three-article-based thesis investigates the phenomenon of the attitude-intention-behavior gap in a sustainable consumption context. This green gap represents a behavioral bias that hinders the accomplishment of eco-friendly behaviors despite consumers' positive environmental attitudes and beliefs. The overarching goal of the thesis is to gain an in-depth understanding of the gap, its underlying mechanisms, and an overview of the possible solutions to overcome it. The thesis also analyzes the theoretical roots and alternatives for studying the gap by tapping into paradigms (rational vs. behavioral) guiding research on the gap. Three research projects have been conducted to meet these objectives.

The first article is an in-depth narrative literature review that explores the state of the arts of the phenomenon of the green gap in sustainable consumption research. It takes a novel approach by analyzing the paradigms adopted in each study reviewed. Since the green gap relates to the relationship between attitudes, intentions, and behaviors, this article categorizes as part of the rational paradigm the papers that build on the theory of planned behavior and accept the linearity between the three variables. While papers that include other psychological variables to understand and resolve the green gap are considered part of the behavioral paradigm. The first article is concluded with a framework that classifies the existing consumer segments into three categories (greens, gappers, and non-greens) and recommends adopting a relevant paradigm for each segment. A rational paradigm is recommended for green consumers, and a behavioral paradigm is recommended for non-green consumers. The green gappers are considered a gold mine for behavioral insights as their comportments unravel procedural challenges and opportunities for sustainable consumption interventions.

The second article advances the behavioral paradigm and investigates the procedural challenges consumers encounter in their transition journey while

elucidating the diverse costs associated with eco-friendly choices vis s vis the other conventional alternative. Specifically, the perceived green costs associated with green purchasing are explored and conceptualized. This article also develops a scale to measure the perceived green costs and tests their role in aggravating the green gap. Moreover, the predictive power of the perceived green costs (as a behavioral variable) is compared to that of intention (a rational variable) to highlight and extend the paradigm discussion.

The third article furthers a more differentiated approach to behavioral science and explores the role of sample heterogeneity in sustainable consumption interventions. It posits that heterogeneity plays a significant role in the replicability and scalability failure of past and present behavioral interventions in sustainability research, specifically in framing interventions. It thus builds on the results of article 1 by extending the segmentation proposition, as well as those of article 2 by using the costs scale to explore consumers' divergent costs and benefits perceptions towards the green purchase. An experimental study is further conducted to explore the segments' responses to different framing treatments. The empirical evidence shows that sample heterogeneity indeed influences the results of interventions, as only one segment is driving the effect. Namely, the non-green segment represents a significant difference between their responses to two framing treatments (concrete vs. abstract), while the other more engaged segments respond similarly to both treatments.

The thesis contributes to sustainable consumption literature by taking a behavioral approach to understand and overcome the green gap as a behavioral bias, and to move forward in the sustainability journey of consumers.

**Key words:** green gap, attitude-intention-behavior, theory of planned behavior, rational paradigm, behavioral paradigm, perceived green costs, framing effect, heterogeneity, behavioral interventions.

**Methodology:** narrative literature review, scale development, survey, experimental design.

# RÉSUMÉ

Cette thèse en trois articles étudie le phénomène de l'écart entre l'attitude, l'intention et le comportement écoresponsable. Cet écart, dit l'« écart vert » représente un biais comportemental qui limite l'exécution de comportements écoresponsables, malgré des attitudes et des intentions environnementales « positives ». L'objectif principal de cette thèse est donc de mieux comprendre l'écart vert et ses mécanismes sous-jacents, et de proposer des solutions pour le surmonter. Trois études distinctes ont été menées pour répondre à cet objectif.

Le premier article, sous la forme d'une recension systématique de la littérature de 58 articles, explore le phénomène de l'écart vert au sein de la consommation écoresponsable. L'angle d'analyse adopté couvre la nature psychologique paradigmatique de ce phénomène, ainsi que les tendances méthodologiques et d'échantillonnage des études dans la littérature. Les résultats présentent une distinction entre l'approche rationnelle d'une part, qui considère que les attitudes, intentions et comportements doivent s'aligner chez les consommateurs, et d'autre part, l'approche comportementale qui admet que l'être humain fait des choix sous-optimaux et que l'écart vert est un biais comportemental survenant naturellement en raison de la rationalité limitée des consommateurs. Cet article propose un cadre théorique rassemblant les deux approches ainsi qu'un agenda de recherche afin de mieux cibler les segments du marché en adoptant pour chacun un paradigme de recherche qui lui est pertinent.

Le deuxième article propose un approfondissement du paradigme comportemental en étudiant les coûts psychologiques perçus par les consommateurs au cours de leur processus de consommation écoresponsable. Pour mesurer les coûts écologiques perçus, une échelle de mesure systématique de 22 items regroupés en huit sous-dimensions est développée en appliquant la méthodologie de Churchill (1979) : les coûts d'apprentissage, les coûts de performance, les coûts d'incertitude,

les coûts d'évaluation, les coûts relationnels, les coûts monétaires, les coûts de perte de variété et les coûts sensoriels. Une modélisation structurelle SEM a permis de vérifier que les coûts écologiques perçus jouent un rôle de médiation entre l'attitude et le comportement écoresponsable. Enfin, une analyse par régression logistique a montré que les coûts écologiques perçus (une variable comportementale) ont une valeur prédictive statistiquement significative comparable à celle de l'intention (variable rationnelle).

Le troisième article propose une approche plus différenciée des sciences comportementales et explore le rôle de l'hétérogénéité des échantillons dans les interventions de consommation écoresponsable. Il postule que l'hétérogénéité joue un rôle important dans l'amélioration des recherches interventions au sein de la consommation écoresponsable. Il s'appuie ainsi sur les résultats du premier l'article concernant la segmentation, ainsi que ceux du deuxième article en utilisant l'échelle des coûts pour explorer les perceptions divergentes des segments de consommateurs vis-à-vis de l'achat écoresponsable. Au total, trois collectes de données ont été réalisées à cet égard. En premier lieu, l'existence de trois segments hétérogènes aux seins des échantillons de recherches (étude 1, 2 et 3) a été vérifiée. En deuxième lieu, une étude expérimentale (étude 4) a été menée pour explorer les réponses des segments existants à l'égard de différents types de communication (cadrage Abstrait vs. Concret). Les résultats montrent que l'hétérogénéité de l'échantillon influence les réactions des segments envers les intervenions proposées. En particulier, le seul segment qui produit un effet significatif au sein de l'expérimentation est celui des « consommateurs non-verts ». Ce segment démontre la réponse la plus favorable envers le cadrage concret, alors que les autres segments plus engagés (les verts et les « gappers ») répondent de manière similaire aux deux formats de communication proposés.

Cette thèse contribue de manière significative à la littérature sur la consommation écoresponsable en adoptant une approche comportementale pour

comprendre et surmonter l'écart vert en tant que biais comportemental. Elle permet de faire concrètement avancer les connaissances pour favoriser la transition écologique des consommateurs et apporte des outils importants d’éducation de la population à diverses parties prenantes.

**Mots clés :** green gap, attitude-intention-comportement, théorie du comportement planifié, paradigme rationnel, paradigme comportemental, coûts verts perçus, effet de cadrage, hétérogénéité, interventions comportementales.

**Méthodologie :** revue de la littérature narrative, développement d'échelles, enquête, conception expérimentale.

# CHAPTER 1 INTRODUCTION

We are in the midst of a climate crisis. The recently released IPCC 2021 report states that immediate and swift action is needed to face the unprecedented calamities consequent of climate change(Masson-Delmotte, 2021). Governments, businesses, and individuals are expected to make quick changes to counter the direction in which our planet is headed. Governments and businesses are investing heavily in sustainable alternatives in their supply chains, infrastructures, and production processes in response to the situation's urgency. Consumers are also joining the movement by transforming their lifestyles and consumption habits to more sustainable practices and actively reducing their ecological footprint.

Sustainable consumption as part of the underlined United Nations' Sustainable Development Goals is a vital step in facing climate calamities and accomplishing a more just, equitable, and healthy planet for the present and future generations. However, some would argue that the juxtaposition of the terminologies 'sustainable' and 'consumption' represent an oxymoron; while consumption is intertwined with economic growth and presumes the abundance of resources and encourages its deployment to keep the wheels of the economy turning, sustainability assumes and respects the fact that environmental resources are limited, and that they need to be used circularly and moderately to ensure the continuity of life on earth (White, Habib, *et al.*, 2019). To understand sustainable consumption as a coherent

and viable construct, one needs to view it through two different lenses:  an economic lens and a behavioral change lens.

From an economic perspective, we live in a ‘consumer society’; consumers' satisfaction is the goal of the economic system, as consumers' demand is the key component that keeps the economy running and ensures its prosperity. This discourse dates back to the founders of economic theory. Adam Smith, for instance, says: 'Consumption is the sole end and purpose of all production, and the welfare of the producer ought to be attended to, only so far as it may be necessary for promoting that of the consumer [Adam Smith, The Wealth of Nations, 1937, Modern Library edition, p .625] (Goodwin *et al.*, 2008). Including sustainability in this equation cannot implicate a change in consumption size and patterns. Otherwise, it puts the economic system in danger. It rather focuses on replacing conventional ‘polluting’ products with ‘green eco-friendly’ ones. From this perspective, sustainable consumption requires consumers to make small changes to the brands they choose to comply with sustainability. The larger responsibility lies on producers as they make their production processes more efficient. This approach is called the weak approach to sustainability which is predominant in the literature on sustainable consumption (Bălan, 2020).

However, a sustainable transition is needed to meet sustainability goals, where production and consumption systems are transformed for the long term and at a large scale (Bălan, 2020). This is only possible if a radical change to consumption patterns

is attained. Ultimately, this transformation will yield a society where consumers practice sufficiency, consume less, and make an effort in their everyday lives to actively save the planet. This approach is referred to as the strong sustainability approach as it addresses the environmental impacts of consumption as a whole in terms of resource intensity (Bălan, 2020; Heiskanen et Pantzar, 1997). But how do we move from a dominant consumer society to a dominant sustainable society? To answer this question, the behavioral change lens is imperative.

Societal transformations require a change in social practices and, most notably, in individual behaviors. Ultimately to accomplish sustainability, behavioral change must take a radical stance to reduce consumption patterns, switch to local alternatives, promote less processed foods and homemade alternatives, and overall increase consumers' efforts. However, from a behavioral change perspective, this transition will not happen overnight, otherwise, it will backfire and cause reactance. If we want consumers to become green, we need to bring them gradually. Instead of making an edgy switch from heavy consumers to people who reduce, refuse, reuse and recycle, a first step is needed. This step is to get consumers to replace products with more sustainable alternatives, on which the current thesis focuses.

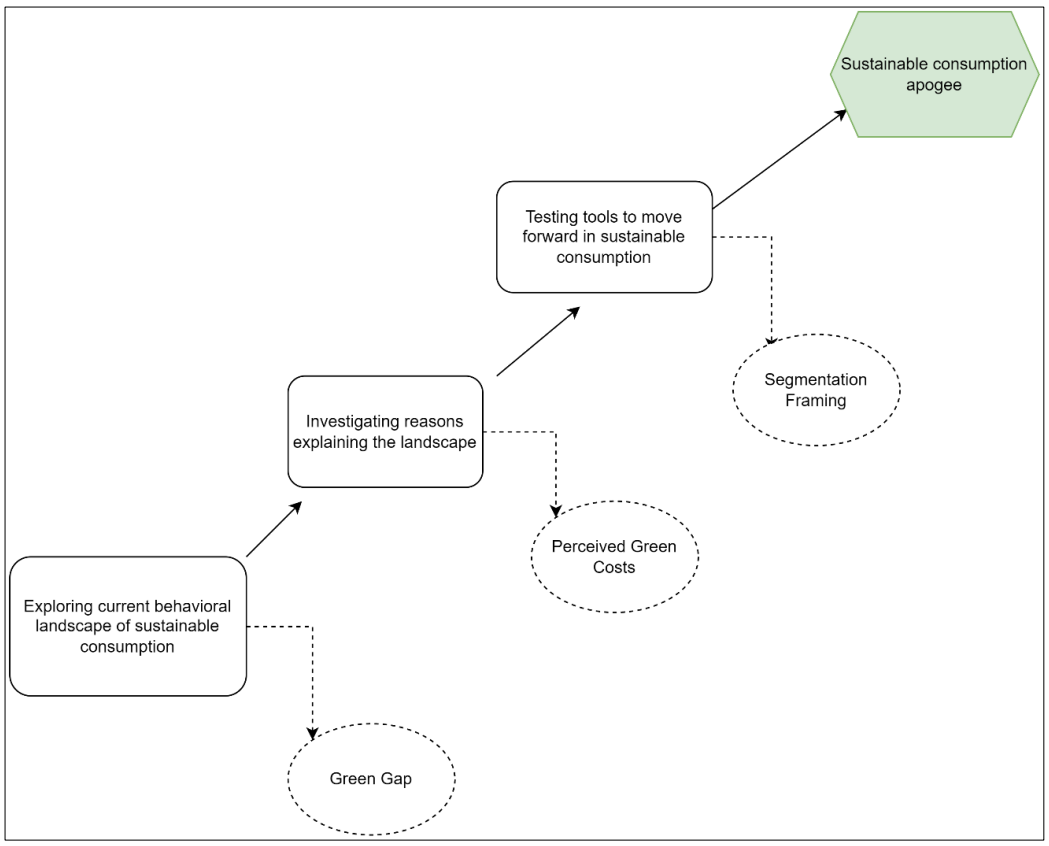


*Figure 1.1. Thesis' conceptual framework*

Another critical aspect of the behavioral change lens is the need for behavioral insights. Sustainable consumption is a normative concept that dictates what people, businesses, and governments need to do to reduce their carbon footprint in the interest of environmental protection (Anantharaman, 2018). But how they need to do it is another subject-specific to behavioral science. It requires a deep understanding of how people actually consume to derive the relevant interventions for how they should consume (Hallsworth et Kirkman, 2020, p. 7).

To sum up the discussion above on a coherent and vital sustainable consumption practice, it is necessary to comprehend that sustainable consumption is possible, that it requires effort from consumers to achieve its apogee, that this effort cannot be required and acquired overnight, and must happen gradually, and that it is important to explore consumers' behavioral landscape to design better sustainable change interventions (van der Linden et Weber, 2021). The current thesis dives into this universe by exploring sustainable consumption scenery and discovering elements of change through behavioral interventions.

Sustainable consumption is gaining momentum along with the awareness of ecological transition's importance and urgency. Nevertheless, not everybody is on board with this trend. There is still an effort to be made to reach the ultimate sustainable consumption goals and to ensure that a majority of individuals in our society align their lives and consumption patterns with sustainable goals. At the individual consumer level, we observe reluctance and hesitance of consumers to adopt the ecological vogue. Individuals are somewhat behind in making an ecological consumption choice, expanding products' lives, or disposing responsibly of the consumed goods. While consumers are aware that the environment is in a critical condition and understand that they need to make changes to their lives to assume their part in protecting the planet from further damage, they fail to translate these concerns into tangible contributions. This inconsistency between individuals' beliefs and

actions is well documented in the psychological literature as the attitude-behavior gap.

This attitude-behavior gap (or behavioral gap) has attracted attention from researchers in several disciplines such as marketing, psychology, and behavioral science. The behavioral gap has appeared in prominent behavioral economics books under different titles and through different lenses and anecdotes. For instance, in the first chapter of the notorious book 'Nudge', Cass Sunstein and Richard Thaler talk about behavioral biases and blunders (Thaler et Sunstein, 2021). Inconsistency between what people expect of themselves versus what they actually do appears under the over-optimism and overconfidence bias, as well as under the 'whatever effect' where people, despite their intention to change something, fail to put in the effort, thus sticking into the status quo and falling into attitude-behavior gaps. Another example appears in the eminent work of Dilip Soman 'The last mile', where the attitude-behavior gap is referred to as the center of modern irrationality; people retain knowledge about important behaviors that need to be done for their own well-being, yet they flounder to translate it into actual behavior (Soman, 2015). Dan Ariely also acknowledges the attitude-behavior gap in his esteemed book 'Predictably irrational', where he asks at the beginning of the seventh chapter, 'Why can't we make ourselves do what we want to do?' (Ariely et Jones, 2008).

Seemingly, the attitude-behavior gap is not a recent phenomenon in behavioral science, nor is it specific to sustainable action. Behavioral gaps are

traceable in several other life domains such as physical activity, academic performance, health, financial, and prevention behavior. One common aspect of these behaviors is that they directly affect the action-taker/decision-maker. In contrast, sustainable behavior differs substantially from these behaviors, as its consequences are primarily altruistic (to the benefit of the environment and not that of the individual) and temporally distant from the decision-maker. Furthermore, the mere existence of the behavioral gap leads to its persistence: people who 'gap' once become indifferent over time; they get used to making the unsustainable choice and justifying their behavior (Gruber, Verena et Schlegelmilch, Bodo B, 2014), thus making the transition more and more difficult. Hence, understanding the attitude-behavior gap in sustainable consumption becomes more challenging and pressing in time now than ever.

The current thesis investigates the attitude-behavior gap in the sustainable consumption context. Given the exceptional scientific relevance of this behavioral gap in environmental consumption compared to other contexts, and because the time is pressing to meet ecological goals, a profound and systematic investigation of the green gap seems relevant and necessary. On the one hand, resolving the green gap would elucidate the factors holding individuals from accomplishing their sustainable goals and ambitions. While a transition is demanded from all individuals, people who fall in the green gap already believe in the importance of environmental behavior and

only need a push to join the ecological movement. Consequently, they represent low-hanging fruits for companies and governments.

On the other hand, moving forward would only be possible once we acknowledge and study the problems related to *unsustainable* behavior (rather than sustainable behavior) intentionally, comprehensively, and systematically (Prothero *et al.*, 2011). Mainstream research focuses on motivations to adopt the green vogue and reasons for adopting ecological choices. Nevertheless, adopting a distinct point of view and addressing the reasons *hindering* the green behavior would shift the analysis and provide a fuller and more complete display of the situation.

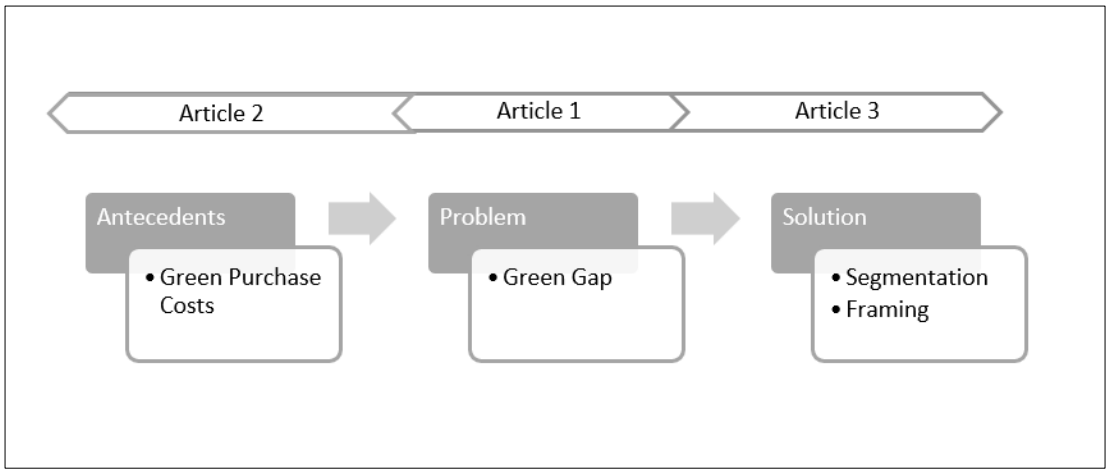


***Figure 1.2*** *Manuscript-based thesis illustration*

The overarching goal of this thesis is to investigate the green gap phenomenon by addressing the following research question: How can we explain and resolve the gap? The present thesis approaches this question following a scientific inquiry unfolding three research articles. The first article is an in-depth literature review

exploring the phenomenon of the green gap in sustainable consumption research. It takes a novel approach by analyzing the paradigms adopted in each study reviewed. Since the green gap relates to the relationship between attitudes, intentions, and behaviors, this article considers papers that accept the linearity between the three variables and build on the theory of planned behavior as part of the rational paradigm. While papers that include other psychological variables to understand and resolve the green gap are considered part of the behavioral paradigm. The first article is concluded with a framework that classifies the existing consumer segments into three categories (greens, gappers, and non-greens) and suggests a relevant paradigm for each segment. A rational paradigm is recommended for green consumers, and a behavioral paradigm is recommended for non-green consumers. The green gappers are considered a gold mine for behavioral insights as their comportments unravel procedural challenges and opportunities for sustainable consumption interventions.

The second article advances the behavioral paradigm and investigates the procedural challenges consumers encounter in their transition journey in elucidating the diverse costs associated with ecofriendly choices vis s vis the other conventional alternative. Specifically, the perceived green costs associated with green purchasing are explored and conceptualized. This article also develops a scale to measure the perceived green costs and tests their role in aggravating the green gap. Moreover, the predictive power of the perceived green costs (as a behavioral variable) is compared

to that of intention (a rational variable) to highlight and extend the paradigm discussion.

The third article furthers a more differentiated (i.e. precision) approach to behavioral science (Dubé *et al.*, 2021) and explores the role of sample heterogeneity in sustainable consumption interventions. Building upon work by Soman et Hossain (2020), the third article posits that heterogeneity plays a significant role in the replicability and scalability failure of past and present behavioral interventions in sustainability research, specifically in framing interventions. It thus builds on the results of article 1 by extending the segmentation proposition, as well as those of article 2 by using the costs scale to explore consumers' divergent costs and benefits perceptions towards the green purchase. An experimental study is further conducted to explore the segments' responses to different framing treatments. The empirical evidence shows that sample heterogeneity indeed influences the results of interventions, as only one segment is driving the effect. Namely, the non-green segment represents a significant difference between their responses to two framing treatments (concrete vs. abstract), while the other more engaged segments respond similarly to both treatments.

The three articles introduced above represent the core of the current thesis, as illustrated in Figure 1 and Figure 2. The thesis is organized as follows; first, the methodological section is presented, in which ontological and epistemological positioning are discussed along with methodologies mobilized to answer the research

question stated above. This is followed by the three articles, each representing one chapter of the thesis. Finally, the thesis is closed with a concluding chapter in which theoretical and managerial implications are discussed, as well as limitations and future research directions.

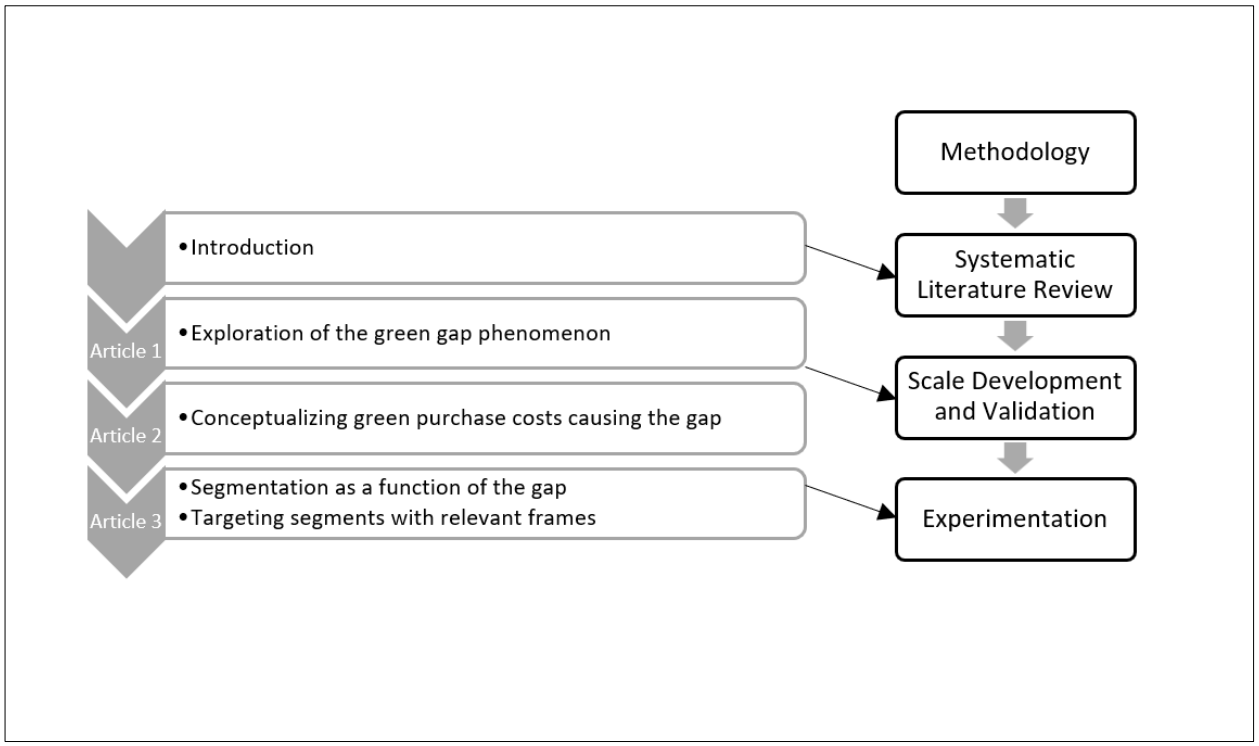


***Figure 1.3*** *Thesis progression*

# CHAPTER 2 METHODOLOGY

This thesis mobilizes several methodological tools that are presented in the current section. First, the philosophical positioning of the thesis is advocated, including paradigm choice, ontological and epistemological adherences. Then are presented the methodological tools engaged in accomplishing the theoretical and the empirical work, including literature review process, scale development, survey study, and experimental design. The section is concluded with a discussion on sampling techniques most relevant to the work at hand.

## 2.1 Research Philosophy and Paradigm

Research paradigm can be defined as "a worldview that defines, for its holder, the nature of the 'world,' the individual's place in it, and the range of possible relationships to that world and its parts" (Guba et Lincoln, 1994). In social sciences, there are several research paradigms and several categorizations of these paradigms, which are usually interrelated. For instance, Guba et Lincoln (1994) define four research paradigms: positivism, post-positivism, critical theory, and constructivism. On the other hand, Bogdan *et al.* (1975, p. 2)1, state that there are two major research paradigms in social sciences: positivism and idealism. These two research paradigms

1 As cited by Rohit Deshpande, «"Paradigms lost": On theory and method in research in marketing», *Journal of marketing* 47, no. 4 (1983).

are the most recurrent, and the debate between their adherents has been ongoing for thousands of years.

In consumer research, there has been a prominent attempt to reconcile the two world views. In his paper 'A Reconciliation of humanism and positivism in the practice of consumer research', Heath (1992) argues that the differences between the two paradigms are mostly terminological and that the adherents of the two camps share more similarities than differences in their practices. He then introduces two research paradigms that are plausible reconciliations of the existing chasm. The paradigm typology in consumer research would thus include the four following paradigms:

1- Doctrinaire naturalism/positivism: which admit the existence of only one reality that the researcher can explore objectively, and which perceives human behavior as deterministic

2- Liberal naturalism: which admits the existence of one and only reality, but contrary to the doctrinaire naturalism, acknowledges the interpretative character imprinted in the relationship between the researcher and knowledge. It also mixes both voluntaristic and deterministic structure of the human behavior.

3- Doctrinaire humanism: which acknowledges the existence of multiple realities as mental constructions of each human being, and which admits the voluntaristic nature of human behavior.

4- Conservative humanism: which is similar to doctrinaire humanism in admitting the existence of multiple realities but differs from it in

acknowledging the deterministic part of human behavior in addition to its voluntaristic part.

Doctrinaire humanism and doctrinaire positivism prevail as the extreme poles of the continuum, and liberal naturalism and conservative humanism constitute a middle ground for philosophical research paradigms in consumer research. We navigate the rest of this discussion on the philosophy of science based on the above-displayed distinction.

The philosophical positioning of the current thesis is liberal positivism. This choice emanates from a maturation process: the researcher went back and forth in their positioning, experimented with several world views, debated with others and with themselves, and contemplated the coherence between their beliefs as a researcher and as an individual human being. Because of the philosophical nature of paradigms and the metaphysical dimension that dominates them, their choice must be accepted based ‘simply on faith’(Guba et Lincoln, 1994). However, a researcher must hold convincing arguments when adopting a paradigm, and their choice should be justifiable to a certain extent. To address the argumentation part of paradigm choice, it is reasonable to present the three fundamental questions that constitute the inquiry paradigm according to Guba et Lincoln (1994):

1- The ontological question which tackles the nature of reality

2- The epistemological question which contemplates the relationship between the researcher and research subject

3- The methodological question which delves into the tools that the researcher would mobilize to study the research subject.

In the rest of this section, the thesis's philosophical positioning is illustrated by justifying its ontological, epistemological, and methodological queries.

## 2.2 Ontological positioning

Christian Wolff (1730) defines ontology as 'an a priori discipline that could reveal the essence of things' (Simons, 2015). Ontology deals with questions about reality; what is real, what is the form and nature of reality, and what can be known about it? (Guba et Lincoln, 1994). Three theories of knowledge can be displayed to answer part of these questions: realism, nominalism, and relativism. While other schools of thought exist, such as rationalism, irrationalism, idealism…etc. the discussion is limited to these three views to simplify this philosophical quest. To begin with, realism presumes that 'at least part of reality is ontologically independent of human minds'(Niiniluoto, 2002). To illustrate, consider the following quote of Nochlin (1971, p. 40):

'That what we see with our eyes and touch with our hands is real and exists independently of us in space and time, is an instinctive belief of man. Its formulation and its vindication are a work of reflective thought. This is realism. The origin of realism therefore lies in the unconscious convictions of man. And its development consists in making it a conscious and logically grounded self-consistent theory'.

Opposite to this view, nominalism stipulates that reality does not exist outside of human cognition. On the contrary, ideas and concepts exist only in the words that describe them (Poincaré, 1905//970, p.9)2. The debate between those two views is thus on the nature of reality: while realism posits that reality exists outside human cognition and words, nominalism affirms that research only deals with the nominations or names that we ascribe to objects and that reality exists within these nominations.

The third school of thought that is believed to reconcile the two former views is relativism. As Kant portrays it, relativism assumes that reality exists independently, but our understanding of it is bound, or more precisely *relative*, to human cognition and perception (O'Grady, 2014, p. 53-88). This view admits the existence of parts of reality independently of human recognition but complements this assumption with humans' relative reception of this reality. The thesis endorses this last view, as its author believes that relativism mirrors the knowledge construction activities mobilized in this thesis.

First, the thesis attempts to dress a portrait and a state of the art research on the green gap phenomenon through a literature review. Acknowledging the multiple

2 As cited by Myriam Ertz, «Quatre essais sur la consommation collaborative et les pratiques de multiples vies des objets», (2017).

causes of the green gap and the relative interpretations of researchers on this issue echoes relativist ontology. Second, it is readily affirmed in the introduction that the attitude-behavior gap is a context-specific phenomenon and that knowledge on this subject is influenced by the domain in which it is applied; this contradicts the principle of the universal laws of realism. Third and finally, the green gap phenomenon studied embodies consumers' psychological perceptions and behavior, and by modeling these variables, it is presumed that a converging reality would emerge. This reality is both socially existing and intellectually accessible by the researcher, reflecting the reconciliatory aspect of Kantian relativism. By that, the relativist ontological positioning of the current thesis is sustained. Next, the epistemological inquiry of the research at hand is discussed.

## 2.3 Epistemological positioning

According to Guba et Lincoln (1994), epistemology addresses the relationship between the researcher and the research subject. It addresses how the researcher can approach and explore the subject studied and acquire knowledge about the existing reality. This process is surely dependent on and bound to the ontological positioning of the researcher. In the present section on epistemological positioning, two main issues are discussed in the conduct of scientific research: the methods of scientific inquiry and the models of inquiry. Historically, there have been two opposing epistemological methods of research: rationalism and empiricism. While empiricism limits the sources of knowledge to the experience of the senses (Pecorino,

2015), rationalism recognizes that without logical reasoning which occurs in the mind, no knowledge can be produced (Truncellito, ---).

Despite the apparent contradiction, the two views are complementary in consumption research. Indeed, the philosopher Kant embraces this reconciling point of view and advocates for the complementarity of sensory observation (empirical) and logical reasoning (rationalism), as the first informs about what exists in the field, and the second brings regularity to the observation (Coccia, 2018). As in the thesis' paradigm positioning, a middle ground is adopted, in this case Kantian's synthesis of empiricism and rationalism, which accentuates the role of both sensory procedures and rational techniques as inquiry methods to approximate the existing reality. Note that, this thesis does not embrace Kant's view on the impossibility of knowing reality, nor the later evolution of this discussion into nihilism.

As for the models of inquiry, we distinguish between the hypothetico-deductive model, the inductive model, and the abductive model. The hypothetico-deductive model ( or shortly the deductive model) is the most popular and widespread in the social science academic milieu, and this is palpable from the expected order of scientific manuscripts starting with a theory and hypotheses and then an empirical work follows to verify or falsify the stated propositions (Woiceshyn et Daellenbach, 2018). This model presumes that to conduct scientific inquiries, the researcher starts from the general to the particular, inferencing hypothesis from a theory, then verifying or falsifying these hypotheses through empirical work, then closing the loop

by revising the theory. This model was embraced and popularized by Kuhn and Popper (Woiceshyn et Daellenbach, 2018).

On the opposite side, the inductive model observes the particular and draws conclusions and generalizations afterward. Aristotle, the first philosopher, praised the inductive model, which, according to him, precedes the deductive techniques to logically constitute valid theories (Woiceshyn et Daellenbach, 2018). Bacon later endorsed induction and contributed to its development by advocating for the role of experiments in the discovery of causal relationships (Locke, 2007).

Between pure induction and pure deduction, there are philosophers who adopted a middle ground, a model which adopts features from both inductive and deductive models. The pragmatic model or the logic of abduction postulates that identifying a question at the beginning of the inquiry is important, and complementing it with observations from the field is necessary (Coccia, 2018). Hence, the exchange between the particular and the general, the theory and the field, and the induction and deduction is the essence of this model. There is no 'fixed' situation or order in which the scientific process is to be performed.

Due to the nature of the current thesis, the deductive model seems more appropriate. First, a literature review is conducted on the subject of the green gap. This review embodies the theoretical reflection, the general aspect of the problem. Then, following the results of the theoretical considerations, empirical work is conducted to operationalize the construct of green costs and test the hypothesis

related to their role in the green gap phenomenon. This mobilization which starts with theory and then moves to the field, is characteristic of the deductive model. Finally, and as an extension of the thesis, an empirical experimental study is carried out to test another hypothesis deduced from the initial literature review. This second empirical study tests the hypothesis of the role of latent heterogeneity in altering the results of green products advertising. The hypothetico-deductive model thus seems appropriate in the research inquiry of this thesis.

The methodologies that are mobilized in this thesis are discussed in the next section. They reflect the authors' epistemological choice in both the methods and the models of the research journey.

## 2.4 Methodological positioning

The thesis 'paradigm along with ontological and epistemological positionings of the author have been defined and justified. These positionings advise methodologies through which research will be conducted. Due to the versatile nature of the philosophical positionings of this thesis, and because in consumer research, paradigm differences only slightly influence the methodological practices (Heath, 1992), several qualitative and quantitative methodologies are mobilized to address the thesis subject.

From a liberal positivist paradigm, the reality sought is an existing reality outside the cognition of the researcher, and hence the latter exerts an outsider's look

on the phenomenon. This distance between the researcher and the subject of the study, recurrent in positivist thought, favors quantitative research methods. We hence postulate that social reality can be represented through measurable variables. Articles 2 and 3 manifest this assumption as the first follows a scale development methodology, and the latter implements an experimental research design. Moreover, a causal explanation is sought through structural equation modeling. This type of analysis is employed in article 2 to comprehend the mechanisms underlying the green gap phenomenon and test the relationship between green costs and the variables of the theory of planned behavior.

As for the subject's agency, the deterministic assumption informs the data analysis of the experiments to derive general rules that govern the relationship between consumers and the ecological purchase option. Complementarily to the deterministic thought, the author of the thesis admits that the voluntary and free choice of the participants are bound to context, time, and circumstances. This view is mirrored in the third article where experimental design is adopted and changes in the conditions are presumed to cause participants' behavior.

Although the interaction between the researcher and the subject of the study is inevitable, the mobilized methods and the rigour in which they are implemented reduce substantially the researcher's influence, and hence the resulting knowledge would approximate the existing reality on the green gap phenomenon.

Overall, four essential research methodologies are mobilized: literature review process, scale development, survey study and experimental study. These methodological tools are presented in what follows, and then the sampling strategy adopted in the empirical work of this thesis is explained.

### 2.4.1 Literature review

A literature review is the result of assembling, organizing and synthesizing knowledge on a specific topic (Schryen *et al.*, 2020). Literature reviews are essential to advance knowledge and promote theoretical and empirical progress (Paré *et al.*, 2015; Webster et Watson, 2002). They can take two fundamental forms: a standalone review dedicated solely for knowledge-building activities and a theoretical background review at the beginning of an empirical research paper. In this thesis, the goal is to integrate the two forms of literature reviews in the research conducted. Namely, the first article represents a standalone literature review on the topic of the green attitude-intention-behavior gap. Its main objective is to present a state-of-the-art descriptive narration of the literature on this behavioral phenomenon.

Furthermore, the second article is a scale development paper which follows Churchill Jr (1979)'s paradigm for scale development and begins with a literature review on the topic of perceived green costs. This literature review serves as a guide to the following steps of scale development and validation. Finally, the third paper integrates a literature review on the benefits of purchasing green products and a

review of the framing strategies used in green advertising. Note that the second and third articles integrate literature reviews as part of their theoretical background and adhere to the second form of literature reviews.

As previously stated, the first article represents a systematic narrative literature review, which answers two research questions; first what do we know about the attitude-intention-behavior gap in sustainable consumption research? And second, what are the paradigms adopted by the past research on the subject? To answer these questions, the scope of the review is first established, then the inclusion and exclusion criteria are determined, followed by a guiding framework to categorize the reviewed studies. To retrieve the relevant papers, keywords and keyword truncations are prepared, and two databases (Web of Science and Scopus) are consulted. The articles' titles and abstracts are then scanned for relevance, and only 58 articles remain for further analysis. A thematic analysis is preformed to categorize the articles, as well as to infer the paradigms used, and other important metrics such as the green product studied, research methodology and guiding theory.

The second and third papers' literature reviews followed a less structured process, with mostly google scholar searches and snowball literature retrieval. The relevant articles are nevertheless organized in excel sheets to display their content and simplify access to their methods and essential results.

### 2.4.2 Scale development

Quantitative research is based on measurement items or phrases representing a specific construct of interest in the social world and aims to capture and quantify it through an empirical estimate (Gerbing et Anderson, 1988). In the current thesis, the causes underlying the green gap phenomenon are manifold. However, the extant literature casts a light on the underlying costs of the green product purchase. It follows that perceived costs would be potential underlying mechanisms that hinder green purchase behavior.

Nevertheless, a quantitative method is advised to test this proposition, but the literature lacks a valid and reliable measure of costs in a sustainable consumption context. For this reason, a scale development process is embraced to overcome the operationalization impasse and to test the suggested hypothesis.

Following the lines of thinking above, the second thesis article is built around the scale development paradigm of Churchill Jr (1979). First, a literature search is conducted to make sense of the construct in play and assemble enough knowledge for construct's domain specification. Next, the researcher generates a sample of items based on the literature search results and qualitative data collection such as interviews or focus groups. For the current research, a series of semi-directed interviews are conducted with 13 female participants, and then analyzed using N-Vivio software following a thematic data analysis approach. The generated items (a total of 73 items)

get purified next, through an evaluation process by experienced marketing professors. Five professors agreed to help us with this step, and their feedback to modify or delete items was incorporated. The resulting 41 items served as a basis for scale refinement through quantitative data collection.

Three other quantitative data collections followed to test the measurement tool's validity and reliability and confirm its theoretical and empirical relevance.

### 2.4.3 Survey study

Survey data is the mainstream data collection method in marketing research (Mooi *et al.*, 2017). By asking closed-ended questions and giving options to choose from, marketers collect data that would help them predict consumers' purchase behavior and forecast sales (Mooi *et al.*, 2017). Formally, a survey is *'a systematic method for gathering information from ( a sample of ) entities for the purposes of constructing quantitative descriptors of the attributes of the larger population of which entities are members'* (Groves *et al.*, 2011). Conducting a survey study requires determining the survey goal, type of survey, administration method, measurement tools, and the questions' design (Mooi *et al.*, 2017).

In the current thesis, the survey method is used in the second and third articles. For the second article, the goal of the survey is to purify and validate the measurement tool developed and test the effect of the construct of costs on the relationship between attitude, intention, and behavior. As for the third article, the

survey is used to collect descriptive data and outcome variables in the experimental design (that are explained in the next section). For both articles, the survey integrates close-ended questions, either developed by the researcher (scale development) or borrowed from the extended literature on the subject. The measurement items are displayed as multiple-choice questions, and several question designs are picked, mainly to diversify the design, avoid participant boredom, and enhance participants' attention span. Examples of these designs would be five points Likert scale (Totally agree – Totally disagree), semantic differential (choice between two extremes such as enjoyable- unenjoyable), and multiple choice answers (to frequency questions and demographics).

After carefully choosing and designing the surveys' questions, the choice of online channels is concluded to recruit participants for several reasons. First, these methods' accessibility and minimal costs make them attractive for early career researchers, especially Ph.D. candidates with limited budgets. Second, the data collection occurred mostly amid the COVID-19 pandemic shutdown, which made it practically impossible to administer the questionnaire in any other way than online. Third, online surveys have proved to be a reliable and valid method to collect data of which the quality is similar to that of pen and paper surveys (Gosling *et al.*, 2004). Finally, the online method allows for an affordable longitudinal study that is adopt in the second. Different portals are referred to for recruiting participants, such as Facebook groups, Amazon MTurk, and Prolific Academic.

### 2.4.4 Experimental design

Experiments are a type of research method which objective is to test a causal relationship, or the effect of the independent variable (treatment variable) on the dependent variable (outcome variable), while controlling for other extraneous variables (Smith et Albaum, 2010, p. 155-156). The main difference between experiments and survey design is that the former implicates the researcher's intervention, who manipulates the treatment variable to compare the outcomes of several groups of participants and statistically infer the causal relationship. On the opposite end, the latter makes these inferences based on the direct answers of participants, without any manipulation or difference between groups of research participants (Smith et Albaum, 2010, p. 154). Experiments are widespread in marketing and sustainable consumption research. For instance, White et Simpson (2013) use experiments to study the influence of the normative appeal tone in advertising on altering grass-cycling and composting behavior, and Reczek *et al.* (2018) conduct experimental studies to test the effect of concrete vs. abstract message framing on the decision to purchase an eco-friendly product.

In social science research, experiments can be performed in the field or the laboratory. There are also several experimental designs such as randomized, block, and split-plot designs (Dean *et al.*, 1999, p. 17). Conducting an experiment is both a science and an art; thus specific steps must be followed to ensure the replicability and scientific validity of behavioral experiments (Dean *et al.,* 1999):

- First, the researcher defines the objective of the experiment by answering the question: "what is the main purpose of running this experiment".
- Second, the sources of variation are identified (treatment variable, treatment variable levels, experimental units, extraneous factors and noise).
- Third, the rule for assigning participants to specific conditions (treatments) is decided (randomized, block design, quasi-experimental…)
- Fourth, the measurement tools, experimental procedure, and expected challenges are discussed and resolved.
- Fifth, the researcher runs a pilot study to ensure the experiment is well designed, review weaknesses, and alleviate probable noise and difficulties.
- Sixth, the analysis model is outlined, and the number of observations needed is estimated (or calculated)
- Finally, the decisions are reviewed and revised; the experiment is ready.

In the current thesis, the third article adheres to the experimental research design. Precisely, the goal of experimenting is to explore a match between consumer segments (green, brown, and gappers) and message benefit and framing (personal vs. altruistic benefit and concrete vs abstract framing). The thesis' hypothesis is that existing experimental research in sustainable consumption does not consider the heterogeneous nature of random samples, thus presenting contradicting results in terms of the optimal green message format. The segments are a fundamental confounding variable, which alters the participants' green purchase behavior outcomes. The experimental treatments manipulate the message framing and benefit in a 2 x 2 factorial design, and in each condition, a random sample is assigned.

Naturally, the random sample is composed of several consumer segments; hence a cross-sectional comparative analysis (2x 2 x3) ought to be performed. The pilot studies' objective is to confirm manipulation checks in the designed experiments, in other words, these studies validate that the designed conditions are perceived as low vs. high construal (abstractness level) and as oriented to personal vs environmental benefits.

### 2.4.5 Sampling methods

Often when conducting research, especially in marketing, researchers recruit a sample of the population for affordability and accessibility reasons, and later the results would be generalizable to the population primarily represented by the participants' sample. Thus sampling is the process of selecting cases of the extended population which are representative of this population (Mooi *et al.*, 2017). There are fundamentally three sampling strategies: census, probability sampling, and non-probability sampling. Census is outside the scope of this thesis since it is only feasible for research with important budgets and by organizations who have access to the members of the whole population. Hence, next are presented the probabilistic and non-probabilistic sampling methods.

- Probabilistic sampling offers every individual in the population an equal chance to be included in the sample (Mooi *et al.*, 2017), thus promising bias-free selection of the sample units (Smith et Albaum, 2010). Examples of

probabilistic sampling techniques are simple random sampling, systematic sampling, stratified sampling, and cluster sampling (Mooi *et al.*, 2017).

- Non-probabilistic sampling, on the other hand, does not give an equal chance for each member of the population to be selected, as their inclusion depends on factors such as the researcher's acquaintances, judgment, and convenience (Smith et Albaum, 2010). Non-probabilistic sampling techniques include judgment sampling, snowball sampling, quota sampling, and other types of convenience sampling.

The sampling methods displayed above suggest that sampling happens in a top-bottom manner, i.e., the researcher decides how and whom to include in their research sample. However, with the advancement of technologies, and the widespread acceptance of embracing online recruitment platform, a new form of sampling has surfaced; for this sampling, boundaries are defined by the researcher, but the selection of participants happens bottom-up, i.e., participants are self-selected to participate in the study. For instance, amazon Mtukers and prolific academic participants choose to participate in the surveys to which they are eligible. This form of sampling is far from being probabilistic, as it does not give an equal chance of inclusion to all members of the population. On the other hand, it does not depend on the convenience nor the judgment of the researcher since the self-selection factor of participants greatly influences the structure of the sample. For online panel recruitment surveys, this sampling strategy is referred to as *online opt-in sampling technique* (Malhotra, 2019), which is more non-probabilistic than probabilistic, but at the same time, does not fit a specific category of the non-probabilistic techniques stated above.

Online opt-in sampling is based on two steps; first, the researcher specifies parameters for the participants eligible to participate in the study such as the country of residency, spoken languages, age, gender ..etc (Litman et Robinson, 2020), then a summary of the study is published on the dashboard where eligible participants can see and read details about study. The second step is that of the participants opting in to participate in the study. This technique is used to recruit participants in the data collection of articles two and three.

It is worth mentioning that sampling and sample structure plays a pivotal role in the current thesis. Article three revolves around the heterogeneity of research samples in sustainable consumption experimental research and posits that participants belong to several segments in the market, precisely three, which differ substantially on the attitudinal, intentional, and behavioral level. And that this heterogeneity should be controlled for if we ought to optimize green messages and progress with knowledge on green advertising, green framing, and green products benefits.

# CHAPTER 3 LITERATURE REVIEW

## Article title: Towards Closing the Attitude-Intention- Behavior Gap in Green Consumption: A Narrative Review of the Literature and an Overview of Future Research

**Chapter information:**

An article based on this chapter has been published as a scientific article in the *Journal of Cleaner Production* ElHaffar, G., Durif, F., & Dubé, L. (2020). Towards closing the attitude-intention-behavior gap in green consumption: a narrative review of the literature and an overview of future research directions. *Journal of Cleaner Production*, 122556.

ABSTRACT

Research on sustainable consumption has gained much popularity in the past few years, and the phenomenon of the green gap has had its share of studies. This phenomenon is known as the discrepancy between what consumers say about their growing concern regarding the environment, on one hand, and what they truly do to help sustain this environment, on the other hand. Although reviews of the motivations and barriers of green consumption are available in the literature, none of them focuses on the green gap, nor examines the methodologies and paradigms used in the available studies. Given the importance of methodology in creating the green gap, and considering the effect of the adopted paradigm on the reliability of the results, it is essential to identify these two aspects in each reviewed study. In this work, we use a pre-assigned framework to categorize 58 articles addressing the green gap, based on the theory, methodology, and paradigm applied in each article. An overview of the articles shows that despite the diversity of methods used, there is still room for improvement in terms of methodology, paradigm, and theory. Most importantly, qualitative studies and experimental designs are needed, and the rational paradigm must not be replaced by but should instead complement the current trend that favors the behavioral economic. As for the theoretical improvements, research focus must shift from exploring the reasons behind the gap to implementing solutions to it.

*Keywords: green gap, attitude, intention, behavior, sustainable, environmental, consumption, purchase.*

## 3.1 Introduction

The advent of technology as a facilitator of human life has come at a consequential price. While societies develop and economies prosper, the environment suffers from pollution and climate change. Therefore, it is essential to adopt a more responsible lifestyle wherein the impact of technology and consumerism on the environment is reduced. Green consumption has emerged as an effective means of alleviating this environmental impact without compromising the quality or quantity of consumption(Liobikienė et Bernatonienė, 2017). This type of consumption implicates the purchase of environmentally friendly merchandise that constitutes a greener alternative to the commonly available selections.

On the micro-level, the environmental issues are important, seeing as most people express interest in changing their consumer habits by purchasing more sustainable, biodegradable, and pro-environmental products. Nevertheless, polls and surveys constantly show an inconsistency between what consumers declare and what they actually do in terms of sustainable behavior (BCR, 2017; Gleim, Mark et Lawson, Stephanie J., 2014). This inconsistency is well acknowledged in the literature, and it is referred to as the green attitude-behavior gap (Park et Lin, 2018), the green intention-behavior gap (Frank et Brock, 2018), or the motivation-behavior gap (Groening *et al.*, 2018). Nowadays, many research efforts are focused on explaining, understanding, and overcoming this phenomenon.

Over the past few years, green consumption research has remarkably increased (Prothero *et al.*, 2011), attracting attention from both, academics and professionals. Therefore, it is only common to have a number of literature reviews examining the state of the art in this area of research. Of the available reviews, two seem quite adjacent to the work at hand. In an article entitled: "Green Marketing Consumer-level theory review", Groening *et al.* (2018) provide a summary of all theories proposed in the literature concerning green consumers, and they classify them into six categories: Values and Knowledge, Beliefs, Attitude, Intentions, Motivations, and Social Confirmation. Interestingly, the findings of the review highlight the ongoing intention-action gap and suggest behavioral insights, such as behavioral intentions and non-economic green influencers, to bridge it. Although Groening *et al.* (2018) did not directly focus on the green gap phenomenon, their work constitutes a valuable resource for researchers in this domain. The other review is that of Joshi et Rahman (2015), who identify factors affecting the green purchase behavior, distinguishing between individual (emotions, habits, perceived behavioral control, perceived consumer effectiveness, values and personal norms, trust, and knowledge, among others) and situational (price, product availability, subjective norm/social norm and reference group, product attributes and quality, store related attributes, brand image, and eco-labelling, among others) factors. In their review, Joshi et Rahman (2015) present each variable along with the direction of its influence on the green purchase intention and/or behavior.

Although the two reviews discussed above provide an extensive summary of the theories and variables implicated in green consumption, they are more focused on green behavior than on the green gap. Generally, green purchase research divides consumers into two groups: those who buy, and those who don't. Meanwhile, green gap research takes attitude and intention into account, thereby diversifying the categories of consumers. In order to determine the suitable methodology and paradigm to be used in research on sustainable consumption, it is essential to identify the type of consumer in terms of his/her attitude, intention, and behavior towards green products. This is particularly important considering that different paradigms lead to different results and insights.

In this work, we conduct a narrative and comprehensive literature review that systematically summarizes all the theories, methodologies, and paradigms adopted in green gap research, and we assess the effect of these elements on intention-behavior inconsistencies. The same categories assigned by Carrington *et al.* (2016) in their paper on the ideology of the attitude-behavior gap are adopted herein. An overview of the reasons behind the green gap and the possible solutions of this phenomenon is also provided. This is particularly important considering that the four component framework commonly used in green consumption research ((Carrington *et al.*, 2016) suggests that the gap may be attributed to methodological bias only. Moreover, the available reviews on green gap research are either outdated (See for example Kollmuss et Agyeman (2002), limited to one specific sector (See for example Antimova *et al.*

(2012)), or do not take methodology and paradigm into consideration (See for example Joshi et Rahman (2015)). To the best of our knowledge, this work constitutes the first narrative review on the green gap with emphasis on theories, methodologies, and paradigms. The available reviews are either focused on "green motivations" (variables positively influencing green purchase) or "green barriers" (variables negatively influencing green purchase). Moreover, unlike other studies in the literature, this review presents an assessment of methodological research design and paradigm dominance, both of which have been overlooked before. By marrying the theoretical and methodological perspectives, we reduce result inconsistencies, thereby facilitating market evaluations and advancing the implementation of ad hoc green marketing strategies (Groening *et al.*, 2018). Overall, the analyses presented herein can be built upon in future studies to overcome the limitations of the currently available methodologies and to explore new areas in the field of green consumption.

The rest of the paper continues as follows: First, a brief background is presented along with the scope of this paper. Then, the methodology of the review is elaborated, followed by the narrative review. Finally, the findings are discussed, and future research avenues are proposed.

## 3.2 Background

The green gap phenomenon is closely related to the theory of planned behavior (TPB) (Ajzen, 1991; Montano et Kasprzyk, 2015). This theory assumes that attitude,

along with subjective norms and perceived behavioral control, is a major influencer of behavior, and that the relationship between attitude and behavior is mediated by intentions. In various fields of research, the TPB has shown great potential in predicting human behavior (Montano et Kasprzyk, 2015). However, in the context of green consumption, this theory has failed its expectations. Consumers who declare their positive attitudes and intentions to act in a pro-environmental manner do not transform these thoughts into actual behavior (de Barcellos *et al.*, 2011; Dzene et Eglite, 2012; Echegaray et Hansstein, 2017). In addition to TPB, other theories, such as the Attitude-Behavior-Context Theory and the Value-Belief-Norm Theory, have been used to examine the green gap. These theories fall under the rational economic paradigm, where individuals consciously seek to maximize their utility through their consumption choice. Theories from the behavioral paradigm have also been adopted in green gap research, including the Construal level Theory and the Prospect Theory. According to this paradigm, the observed behavior of consumers deviates from the rational model and is highly influenced by emotions and cognitive biases (Mullainathan et Thaler, 2000). In this review, we analyze the variations in green gap interpretations based on the two paradigms discussed above.

The definitions of the green gap available in academic references are listed in Table 1. In this work, we define the gap as *the inconsistency between what the individual says regarding his/her growing concern about the environmental problems*

*and what he/she does in terms of actions, behaviors, and contributions to lessen the consequences of these problems*.

| Reference | Definition |
|---|---|
| **(Fahy, 2005)** | The wide gulf between people's environmental values and people's environmentally friendly actions |
| **(Kennedy *et al.*, 2009)** | The incompatibility between pro-environmental values and environmentally-supportive behavior |
| **(McNally, 2011)** | A green gap involves the separation between what the consumer believes should be done to protect and improve the environment and what he or she actually does to help protect and improve the environment |
| **(Antimova *et al.*, 2012)** | When the ostensible attitudes and concerns towards climate change do not translate into concrete actions and personal engagement |
| **(Gruber, V. et Schlegelmilch, B. B., 2014)** | The significant discrepancy between consumers' intentions to buy products with sustainable attributes and their actual purchasing decisions |
| **(Kaaronen, 2017)** | "The gulfs lying between sustainable thinking and behavior due to lack of affordances" |
| ***This paper*** | *The inconsistency between what the individual says regarding his/her growing concern about the environmental problems and what he/she does in terms of actions, behaviors, and contributions to lessen the consequences of these problems* |

***Table 3.1.*** *Definitions of the green gap in the literature.*

### 3.2.1 Scope of the review

Based on the definitions listed in Table 1, the green gap is evident in both, commercial transactions (i.e. buying environmentally friendly products) and non-commercial comportment (i.e. recycling and energy conservation). In this paper, we focus on studies that are solely concerned with the former. Considering the fundamental economic differences between the two types of behavior (commercial and non-commercial), we believe that a separate review should be conducted on the non-commercial comportment of consumers. Articles that do not distinguish between

commercial and non-commercial practices are not included in this review, unless otherwise specified.

In general, sustainability may be analyzed from different perspectives. The environmental, economic, and social growth and justice perspectives constitute the pillars of sustainability (*Report of the World Commission on Environment*, 1987). This review is primarily concerned with the green or environmental aspect of sustainable consumption, and thus, it does not directly address ethical or economic issues. However, studies that tackle sustainability from a broad perspective (environmental, ethical, and economic) are included.

Another criterion for inclusion in this review is that the paper must have the green attitude-behavior gap at the core of its research question. Consequently, papers that mainly revolve around the reasons or barriers of green *behavior* are excluded. This feature distinguishes the work presented here from that of Joshi et Rahman (2015). As for the empirical papers that only prove the existence of the gap, we find that they do not serve our research objective, as they do not provide the explanations or theories needed to understand the underlying causes of the phenomenon. Therefore, they are also excluded from our review. However, intervention studies that aim to overcome the green gap are included, since the information they provide offers platforms to resolve the green gap problem, which pours into the core of this review.

### 3.2.2 Selection of relevant studies

To identify the relevant studies available in the literature, the Scopus and Web of Science databases were thoroughly searched, and the three step methodology of systematic literature review (Bem, 1995) was followed. First, the search keywords were defined, then the data was filtered and cleansed, and finally, the results were analyzed and presented. The keyword combinations used to retrieve the most relevant studies are listed in Annex 1. The initial search resulted in a total of 1146 articles, 481 of which were retrieved from Scopus and 654 from Web of Science. These articles were filtered in several rounds, and the researchers manually screened the output list to exclude irrelevant articles and replicates. They also made sure that the conditions stated in the previous section were respected. The final selection included 58 articles.

## 3.3 Theories, methodologies, and paradigms

In this section, we highlight the general framework and analytical methodology implemented in this review. As shown in the following scheme, the selected articles were divided into four main categories, depending on the type of green gap factors discussed in the article and on the specific target of the study. Herein, we classify the factors into four groups, based on the categories proposed by Carrington *et al.* (2016).

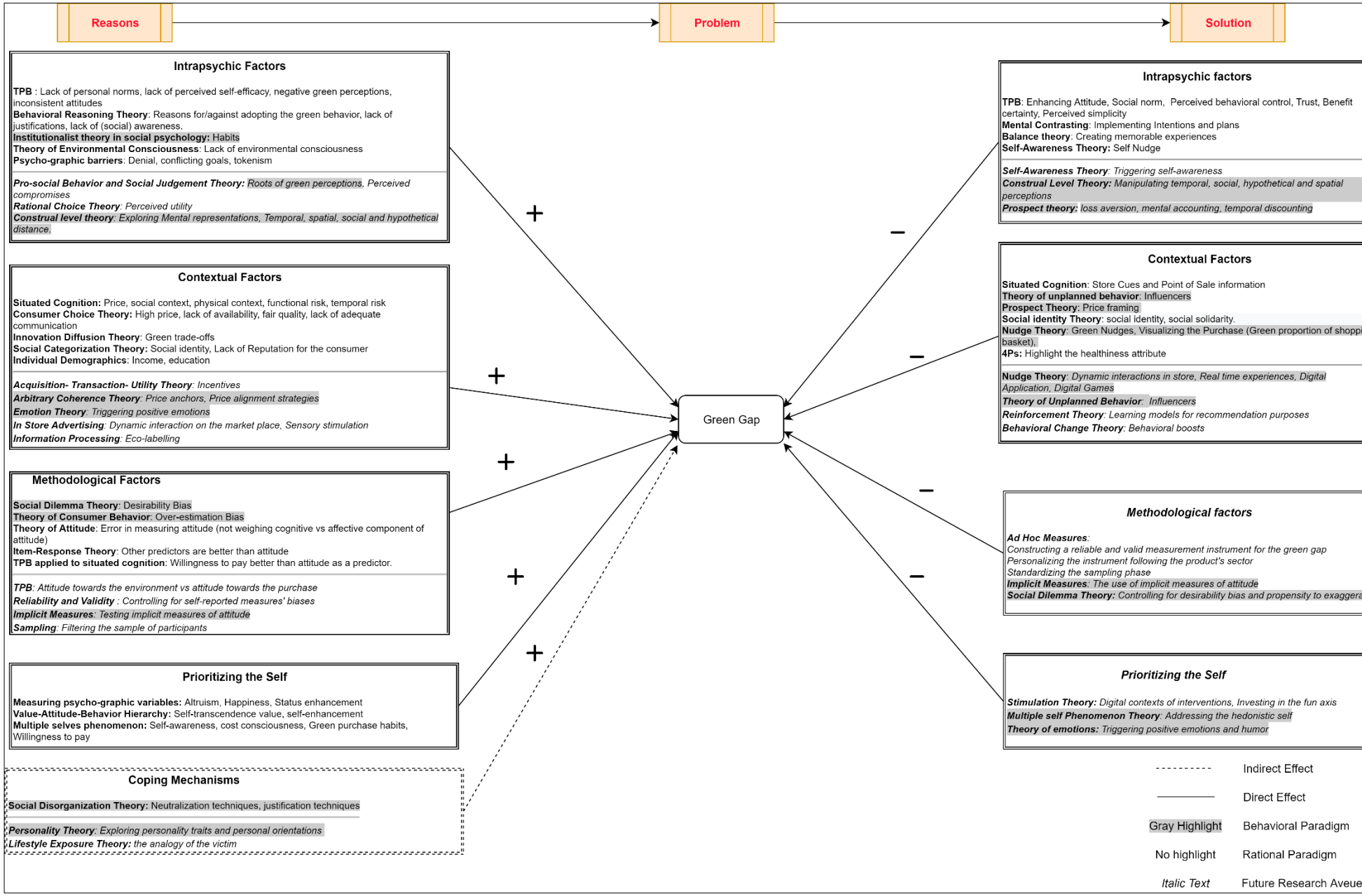


***Figure 3.1.*** *Framework guiding the current systematic review*

The four categories of articles are briefly presented below:

1. Modeling the gap: The articles in this category model the green gap by assembling the variables that are potentially responsible for it. This is achieved using a variety of theories, including the extended TPB, ABC, Value-Belief-Norm, Social Dilemma, and Self Determination theory. Depending on the type of variables discussed, the articles are divided into three subcategories: i) articles that are mainly concerned with individual or intrapsychic factors such as attitude, intention, perceived behavioral efficacy, and personal norms, among others; ii) articles that primarily revolve around the situational or contextual factors such as marketing mix variables, point of sale cues, message attractiveness, and social status, among others; and iii) holistic articles that discuss both, intrapsychic and contextual variables. All three subcategories serve the goal of modelling the gap.
2. Methodological bias: In this category of articles, the green gap is mainly attributed to the lack of rigorous methods, the limitations of measurement instruments, and the overestimation and desirability bias resulting from self-reported assessments.
3. Prioritizing the self over the environment: The studies in this category argue that the dominance of self-interest values over altruistic/environmental values is the primary cause of the green gap. This resonates with the Hedonic Theory, as well as the Rational Choice Theory and utility maximization principle.
4. Coping with the gap: In this category, the studies address the psychological state of the consumer *after* the inconsistent behavior, and they explore the different coping mechanisms that help maintain a sane and coherent condition. While these coping

mechanisms do not directly affect the green gap, they indirectly sustain it by rationalizing the un-ethical behavior and minimizing the feeling of guilt.

All selected articles (58 in total) explained or explored solutions of the green gap phenomenon. Each one of these articles are assigned to one of the four categories listed above, and the guiding theory used in that article is indicated. Theories are usually stated in the theoretical background section of each study, so they are easy to denominate. As for the methodologies (ex. survey, experiment, interview, etc.) used in different studies, they are also highlighted. The dominant paradigm (rational or behavioral) in each study is identified as well. In general, the rational paradigm is used in prescriptive models that are primarily concerned with how an individual is supposed to behave. Meanwhile, the behavioral paradigm uses economic, psychological, and cognitive bias to describe how individuals behave in reality (Mullainathan et Thaler, 2000). Nowadays, the traditional rational model is being gradually shadowed by the behavioral model, so as to better explain the market behavior. This review takes both paradigms into consideration, since they offer solutions that are suited to different types of consumers. In the framework scheme presented above, the behavioral paradigm is highlighted in gray.

### 3.3.1 Modeling the gap

### 3.3.2 Modeling the gap using intrapsychic factors

#### 3.3.2.1 Methodology and sampling

Of the 11 papers in this subcategory, seven use quantitative methods, three use qualitative methods, and one uses a mixture of both. The sample size (number of participants) ranges from 10 to 51 in the qualitative studies, and from 60 to 2000 in the quantitative studies. The participants are filtered in two studies; the first one is an intervention study that targets non-green consumers (Loy, Laura S *et al.*, 2016), while the second examines the self-nudge behavior in green consumers (Torma, G. *et al.*, 2018). Only one paper uses longitudinal panel data (Shepherd *et al.*, 2005). The intervention studies collect data before and after intervention (Litvine, D. et Wüstenhagen, R., 2011; Loy, Laura S *et al.*, 2016), and one of them uses real behavioral measures (Litvine, D. et Wüstenhagen, R., 2011).

#### 3.3.2.2 Paradigms and objectives

The articles in this subcategory hypothesize that the green gap can be explained by an important number of variables, including psychological and cognitive factors, most of which are not usually accounted for when analyzing the gap. Although the majority of articles seeks to explain the green gap, only three propose solutions to this phenomenon (Han, J. *et al.*, 2017; Litvine, D. et Wüstenhagen, R., 2011; Torma, G. *et al.*, 2018). The dominant paradigm in most of these papers is the traditional rational

paradigm; however, one study uses the behavioral paradigm through the theme of habit (Maréchal, 2010).

#### 3.3.2.3 Main findings

##### 3.3.2.3.1 Quantitative findings:

Some studies in this subcategory use models to quantify the direct and indirect (mediation of intention) effects of intrapsychic variables on green purchase behavior. The methodologies used for such assessment are mainly derived from the TPB. Shepherd *et al.* (2005) provide a list of variables that directly affect green behavior on both, commercial and non-commercial levels. On the other hand, Maréchal (2010) analyzes the behavioral factors directly influencing green purchase, and he highlights the role of habits in institutionalizing certain unethical behaviors. In another behavioral study that is based on the triadic sequence of the TPB, the researchers intervene by providing information that stimulates key influencing factors (Litvine, D. et Wüstenhagen, R., 2011). The results of this study show that personal norms, perceived self-efficacy, and willingness to pay are major factors directly affecting green behavior. Moreover, perceived simplicity and benefit certainty are factors that affect behavior indirectly by mediating intentions (Litvine, D. et Wüstenhagen, R., 2011). The study also reveals that in the context of green purchase, trust plays an important role in regulating the relationship between attitude and intention in the attitude→ intention→ behavior sequence. The same argument is presented by Tung *et al.* (2012). Gifford et Chen (2017), on the other hand, show that denial, conflicting goals, and tokenism have

an indirect negative effect on green behavior through the mediation of intentions. However, according to the theory of environmental consciousness, environmental awareness and perceived effectiveness are the main indirect influencers of green consumption (Mishal *et al.*, 2017). In another study, the behavioral reasoning theory is used to show that both, attitudes and intentions are affected by factors promoting green behavior; however, the factors suppressing this behavior affect only the intentions (Claudy *et al.*, 2013). Finally, an intervention study tackles the gap between intentions and behavior, and attempts to bridge it by mental contrasting (Loy, Laura S *et al.*, 2016). Overall, the articles in this subcategory focus on the effects of intrapsychic variables on the green gap and their potential role in bridging it.

| **Relationships between Variables and Main Results** | **Paradigm** | **Method** | **Guiding Theory** | **Green Product-Purchase** | **Paper** |
|---|---|---|---|---|---|
| • Health consciousness → Behavior<br>• Environmental dimension → Behavior<br>• Transportation/waste behavior → Behavior | Rational | Survey | TPB and Means-End Chain Analysis | Food | (Shepherd *et al.*, 2005) |
| • Habit → Behavior | Behavioral | Survey + Interviews | Institutionalist theory in Social psychology | Energy | (Maréchal, 2010) |
| • Attitude → Intention<br>*Trust being a moderator between Attitude and Intention*<br>• Perceived Simplicity → Intention<br>• Benefit certainty → Intention<br>• Intention → Behavior<br>• Personal Norms → Behavior<br>• Perceived Self Efficacy → Behavior<br>• Willingness to Pay → Behavior<br>*Benefit Certainty being a moderator between WTP and Behavior* | Rational | Intervention | TPB | Energy | (Litvine, D. et Wüstenhagen, R., 2011) |

| | | | | | |
|---|---|---|---|---|---|
| • Attitude → Intention<br>• Intention → Behavior<br>*Trust being a moderator between Attitude, Intention and Behavior* | Rational | Survey | TPB | - | (Tung *et al*., 2012) |
| • Reasons For adopting green behavior → Attitude<br>• Reasons For adopting green behavior → Intention<br>• Reasons Against adopting green behavior → (-) Intentions<br>• Attitude → Intentions | Rational | Survey | Behavioral Reasoning Theory | Energy Systems | (Claudy *et al*., 2013) |
| • Intention → Behavior<br>• *Mental Contrasting Implementation Intention being a Moderator between Intention and Behavior* | Rational | Intervention | Mental Contrasting | Meat | (Loy, Laura S *et al*., 2016) |
| • Environmental Consciousness → Green Purchasing Attitude<br>• Environmental Consciousness →Perceived Consumer Effectiveness<br>• Green Purchasing Attitude → Perceived Consumer Effectiveness<br>• Green Intentions → Perceived Consumer Effectiveness<br>• Green Purchasing Attitude→ Green Behaviors→ Green Purchase Behavior | Rational | Survey + Interviews | Theory of Environmental Consciousness | - | (Mishal *et al*., 2017) |
| • Denial → (-) Intentions<br>• Conflicting Goals → (-) Intentions<br>• Tokenism → (-) Intentions | Rational | Survey | Psychographic barriers | Food | (Gifford et Chen, 2017) |

***Table 3.2.*** *Summary of the quantitative articles tackling psychological variables and cognitive processes.*

3.3.2.3.2 Qualitative findings:

The qualitative study performed by Johnstone, M. L. et Tan, L. P. (2015b) shows that green stigma, green reservations, and the perceived difficulty of being green are the main factors influencing green behavior. Meanwhile, Han, J. *et al.* (2017) argue that in addition to the negative green perceptions, lack of justification and lack of social awareness are characteristics of individuals exhibiting green gap behavior. To overcome this gap, consumers should be placed in contact with the green product (Han, J. *et al.*, 2017). Otherwise, they should exert their willpower and nudge themselves to purchase green (self-nudge) (Torma, G. *et al.*, 2018).

### 3.3.3 Modeling the gap using contextual factors

#### 3.3.3.1 Methodology and sampling

Of the 20 studies classified into this subcategory, seven are qualitative and 13 are quantitative. The sample population's size of the qualitative and quantitative articles ranges from 10 to 51 and 65 to 2965, respectively. Although samples are not filtered in most of these studies, filters are used in seven studies to separate between participants with different green perceptions (Kulshreshtha *et al.*, 2017; Zapico *et al.*, 2016), to identify green gappers (Barbarossa et Pastore, 2015) and respondents with green intentions (Frank et Brock, 2018), or to focus on green consumers who have solutions to the problem (Moraes *et al.*, 2012). In one study, the participants were chosen based on their recent purchase of the targeted green product; however, attitudinal sampling was not applied in this study (Olson, 2013). Interestingly, three studies rely on longitudinal data collected over a long period of time, with a time gap between attitudinal and behavioral data collection (Lund *et al.*, 2013; Moraes *et al.*, 2012; Zapico *et al.*, 2016). Finally, five papers use real behavior measures instead of self-reported assessments (Aschemann-Witzel et Niebuhr Aagaard, 2014b; Champniss *et al.*, 2016; Lund *et al.*, 2013; Moraes *et al.*, 2012; Zapico *et al.*, 2016), and only one paper accounts for the social desirability bias (Bodur *et al.*, 2015).

#### 3.3.3.2 Paradigms and objectives

Some articles in this subcategory are primarily concerned with enhancing the predictability of green behavior by increasing the number of contextual factors in the

TPB model. Other studies, on the other hand, argue for the superiority of contextual variables over TPB variables in terms of predictive power. Ten papers investigate the causes of the green gap phenomenon, while eight seek a solution, and two study both, causes and solutions. Of the 20 papers, eight adopt the behavioral paradigm (Aschemann-Witzel et Niebuhr Aagaard, 2014b; Bodur *et al.*, 2015; Champniss *et al.*, 2016; Johnstone et Lindh, 2018; Lee Weisstein *et al.*, 2014; Lund *et al.*, 2013; Momsen et Stoerk, 2014; Moraes *et al.*, 2012; Zapico *et al.*, 2016).

#### 3.3.3.3 Main findings

##### 3.3.3.3.1 Quantitative findings:

The contextual factors analyzed in the quantitative articles are either marketing mix variables, such as in-store cues and choice architecture manipulation, or social variables, such as the social reputation of the consumer. Behavioral insights are redundant in this category of papers. For instance, Lee Weisstein *et al.* (2014) report that price framing (gain vs reduced loss) moderates the relationship between consumers' green perceptions and their intention to buy green products. Similarly, Momsen et Stoerk (2014) show that the default choice nudge effectively drives the purchase of green energy. Moreover, the data presented by Bodur *et al.* (2015) confirms that audience cues and self-construal factors can positively affect the green purchase behavior. Zapico *et al.* (2016) also use behavioral insights to show that consumers can be driven to more sustainable purchases over time, if they can directly visualize the proportion of green products in their shopping carts.

Situated cognition variables are important contextual factors affecting the choice of green purchase. For example, Frank et Brock (2018) show that sale information has a direct effect on consumers' behaviors. Similarly, Campbell et Fairhurst (2016) demonstrate that the atmospheric responsiveness of the store plays an essential role in mediating the relationship between intention and behavior. Information channels that promote green values and offer behavioral alternatives and recommendations have also been effective in promoting the purchase of the green product, even if the consumer has to pay extra for it (Li *et al.*, 2016). However, it should be noted that green campaigns may increase the green gap if they are not acceptable or believable (Kim, Yeonshin *et al.*, 2016) and if the relationship between behavior and target group identity is non-congruent (Champniss *et al.*, 2016).

Consumers' generally perceive that the attributes and quality of green products are inferior to those of the non-green alternative. This promotes the green gap and increases it significantly (Davari, A. et Strutton, D., 2014; Kulshreshtha *et al.*, 2017; Olson, 2013). Therefore, in order to bridge the intention-behavior gap, it is necessary to address the issue of consumer perceptions.

As for the social variables, Zabkar et Hosta (2013) report that a consumer's pro-social status significantly affects his/her intentions (willingness to act), thereby affecting the actual green behavior. Most studies discussed so far are focused on the consumer and his/her responsibility in taking action or responding to the green offers. Lund *et al.* (2013) propose an alternative, albeit significantly remote explanation of the

green gap that frees the consumer from responsibility and blames the non-fully matured market instead.

| | Relationships between Variables and Main Results | Paradigm | Method | Guiding Theory | Green Product-Purchase | Paper |
|---|---|---|---|---|---|---|
| *Marketing Mix* | The increase in the purchase is due to market maturation, and not to an attitudinal change | Behavioral | Survey | - | Food | (Lund *et al.*, 2013) |
| | The value action gap is created by green attribute tradeoffs | Rational | Survey | Innovation Diffusion Theory | Television and Vehicles | (Olson, 2013) |
| | • Default Choice Nudge → Choice | Behavioral | Experimental Field Study | Behavioral Economics | Energy systems | (Momsen et Stoerk, 2014) |
| | • Degree of Greenness (DG) → Intentions<br>Moderator: Price Framing (PF)<br>• DG x PF → Perceived Savings → Perceived Quality → Intentions<br>• DG x PF → Perceived Quality → Perceived Value → Intentions | Behavioral | Experiment | Prospect Theory | Detergent + Light Bulbs | (Lee Weisstein *et al.*, 2014) |
| | • Green Product → Brand Associations<br>• Green Price → Brand Loyalty<br>• Green Product → Brand Trust<br>• Marketing Mix → Perceived Brand Quality<br>• *Environmental Concern being a moderator* | Rational | Survey | TPB- Social Exchange Theory- Expectancy Value Theory | Food | (Davari, A. et Strutton, D., 2014) |
| | • Prediction Request x Audience Clue → Preference<br>• *Self-Construal being a moderator* | Behavioral | Experiment | Self-Awareness Theory | Cleaning Products | (Bodur *et al.*, 2015) |
| | • Attitude → Visualizing the Purchase → Behavior | Behavioral | Intervention | - | Grocery | (Zapico *et al.*, 2016) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | • Information Channels → Willingness to pay extra<br>• Perceptions → Willingness to pay extra<br>• Waste Disposal Methods Guidance → Willingness to pay extra | Rational | Survey | - | - | (Li *et al.*, 2016) |
| | • Message Acceptance → Purchase Intention<br>• *Environmental Commitment being a moderator*<br>*Message Believability being a moderator* | Rational | Field Experiment | Advertising Believability and Environmental psychology | Yogurt and Shampoo | (Kim, Yeonshin *et al.*, 2016) |
| | • Intentions → Purchase Behavior<br>• Intention → Store Atmospheric Responsiveness → Purchase<br>• *Moderators:*<br>• *Trust between intentions and behavior*<br>• *Price consciousness between SAR and Behavior* | Rational | Survey | TPB and Environmental Psychology | Grocery | (Campbell et Fairhurst, 2016) |
| | • Product attributes → Choice<br>• Incentives (Promotions)→Choice | Rational | Survey | TPB and Innovation Diffusion Theory | Television | (Kulshreshtha *et al.*, 2017) |
| | • Point of Sale Information → Behavior<br>• *Moderators:*<br>*Level of Product Category Involvement*<br>• *Partial Moderators:*<br>*Health Consciousness*<br>*Green Consumerism* | Rational | Experiment +Field Study | Atmosphere as a Marketing tool | Grocery | (Frank et Brock, 2018) |
| Social | • Willingness to behave green → Green Behavior<br>Moderator: Pro-social status perceptions<br>• Information about environmental impact → Green Behavior | Rational | Survey | TPB-Exchange Theory-Costly Signaling Theory-Status Characteristics Theory | - | (Zabkar et Hosta, 2013) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | • Behavior-Identity Congruency → Behavior<br>• Behavior –Identity Congruency → Brand Attractiveness | Behavioral | Field Experiment | Social Categorization Theory | Fruit Drinks | (Champniss *et al.*, 2016) |

***Table 3.3.*** *Summary of the quantitative articles modeling the gap using contextual factors.*

3.3.3.3.2 Qualitative findings:

Three papers in this subcategory qualitatively analyze the effect of situated cognition on green behavior. In these papers, the authors argue that a consumer's behavior towards green products is profoundly dependent on the situation in which he/she is placed (Brown *et al.,* 1989), particularly the social and physical context of the purchase. For example, in a marketplace setting, green consumers tend to be more conscious of the price, quality, and lack of availability of the green product (Aschemann-Witzel et Niebuhr Aagaard, 2014b; Barbarossa et Pastore, 2015; Padel et Foster, 2005). In another setting, consumers are more aware of their community and the shopping preferences of other people in their neighborhood (Aschemann-Witzel et Niebuhr Aagaard, 2014b). The competition between situational parameters and moral beliefs exerts a heavy cognitive toll on consumers, to the extent that they would rather overlook the issue of green purchase (Aschemann-Witzel et Niebuhr Aagaard, 2014b; Barbarossa et Pastore, 2015). In addition to situated cognition, qualitative studies show that the financial, functional, and temporal risks associated with the purchase of green products are important factors affecting consumer's green behavior (Durif *et al.,* 2012). Social identity and social solidarity are both emphasized as reliable means of overcoming the green gap (Moraes *et al.,* 2012), and non-economic influencers are

suggested to have an effect in redirecting the purchase behavior towards a more environmentally conscious choice (Johnstone et Lindh, 2018).

### 3.3.4 Modeling the gap: holistic articles

#### 3.3.4.1 Methodology and sampling

Of the 58 papers originally selected from the literature, 14 use both, contextual and intrapsychic factors to model the green gap. Four articles are qualitative, nine are quantitative, and one uses mixed methods (qualitative and quantitative). The sample size in qualitative papers is between 13 and 99, whereas that in quantitative papers it is between 90 and 817. In seven studies, the samples are filtered in order to distinguish between participants with different green values (Chang, C., 2011; Gleim, M. et Lawson, S. J., 2014; Gupta et Ogden, 2009), to target the green consumer (Biswas, 2017), or to target people who are responsible for their household purchases (Perry et Chung, 2016; Young *et al.*, 2010). For filtering their samples, most studies employed self-reported questionnaires, however, two of the papers adapted real behavioral measures for this purpose (Biswas, 2017; Young *et al.*, 2010). It should be noted that none of the studies included in this subcategory is longitudinal. Nevertheless, two studies allow for a time gap between the dates of collection of different types of data; for example, between filtering and experimental data (Chang, C., 2011), or between intention and behavior measurements (Grimmer et Miles, 2017).

#### 3.3.4.2 Paradigms and objectives

All articles in this subcategory argue that the prediction power of the green gap model could be enhanced by including the intrapsychic, as well as the contextual factors. Moreover, all the studies are concerned with the identification of variables contributing to the green gap, and none of them proposes a solution for this gap. In terms of paradigm, the papers are all traditional rationalist.

#### 3.3.4.3 Main findings

##### 3.3.4.3.1 Quantitative findings:

The quantitative articles in this subcategory simultaneously tackle the intrapsychic and contextual variables to better explain the green gap. Based on the TPB model and market data, both types of factors contribute significantly to the gap and can be used to explain behavioral inconsistencies. According to Vermeir et Verbeke (2006), green purchase behaviors are positively affected by favorable attitudes; however, this effect is directly countered by the perception of green product unavailability. In addition, the favorable attitudes are indirectly undermined by peer pressure, via the mediation of intentions. On the other hand, Gupta et Ogden (2009) emphasize the role of social and psychological factors in directly affecting the green purchase behavior. The social factors include the trustworthiness of the green brand, the in group identity of the consumer, and the expectation of other people's cooperation, while the psychological factors include perceived efficacy and preference of the green product (Gupta et Ogden, 2009). Chekima *et al.* (2017) also address the direct influence of

different variables on behavior, and they suggest that attitude, health orientation, and sensory appeal are the main drivers of green food purchasing. The effects of these variables are moderated by the future orientation of consumers. In a study on the choice between conventional and green products, Buder *et al.* (2014b) report that price and availability are the primary market variables affecting a consumer's decision. Personal preferences and product taste and appearance (i.e. the display in the grocery store or food market) also have a strong impact on the final choice. Education, income, subjective norm, and perceived consumer effectiveness constitute additional variables directly affecting green behavior (Park et Lin, 2018).

The remaining papers in this subcategory focus on the indirect effects of variables in altering consumer behavior. For example, Chang, C. (2011) attributes the green gap to a feeling of discomfort generated by the controversy between green advertising claims and ambivalent green attitudes. This feeling negatively influences the credibility of advertisements and promotes unfavorable attitudes towards the green brand (Chang, C., 2011). The utility of the product has also been recognized as a direct and indirect influencer of green purchase behavior. In a study on different types of utility gaps, Biswas (2017) proves that functional and environmental impact gaps affect behavior both, directly and indirectly (through the mediation of intentions), whereas the psychological value gaps exhibit an indirect effect only. Apparently, consumers perceive green products to be lacking in functionality. Similarly, the study conducted by Park et Lin (2018) shows that the utilitarian value of a product directly influences

green purchase intentions, as well as the past green purchase behavior of an individual, whereas self-expressiveness and environmental concern affect behavior via the mediation of intentions. Environmental involvement, information utility, and green trust, were also found to have an indirect influence on behavior through the mediation of attitude and intentions (Wei *et al.* (2017). Considering that plans are effective mediators of the relationship between intentions and behavior, they can also be used to bridge the intention-action gap moderated by environmental involvement, actual behavioral control, and the shopping context of consumers (Grimmer et Miles, 2017).

Finally, the study conducted by M. Gleim and S. J. Lawson (2014) uses green behavior variables to segment the market. Based on the obtained results, the market may be divided into three clustered segments that are mainly discriminated by the difference in price sensitivity, quality perception, lack of availability, and brand loyalty to conventional products.

In summary, the results reported in this subcategory of papers suggest that all attitudes, intentions, and behaviors are effectuated by particular sets of contextual and intrapsychic variables, and that the relationship between these variables can be moderated.

| **Relationships between Variables and Main Results** | **Paradigm** | **Method** | **Guiding Theory** | **Green Product-Purchase** | **Paper** |
|---|---|---|---|---|---|
| • Attitude → Behavior<br>• Moderators:<br>Involvement with sustainability<br>Certainty<br>Perceived Consumer Effectiveness<br>• Perceived Availability → (-) Behavior | Rational | Experiment | Consumer | Food | (Vermeir et Verbek |

| | | | | | |
|---|---|---|---|---|---|
| • Social Norms/Peer Pressure → (-) Intentions | | | Behavior Model | | e, 2006) |
| • Trust → Behavior<br>• In group identity → Behavior<br>• Expectation of others' cooperation → behavior<br>• Perceived Efficacy → Behavior<br>• Perception Preference for green products → Behavior | Rational | Survey | Social Dilemma Theory and Referenc e Group Theory | Energy | (Gupta et Ogden, 2009) |
| • Strength of green claims x Attitude Ambivalence → Discomfort<br>• Discomfort → (-) Advertising Believability<br>• Discomfort → (-) Green Claim Believability<br>• Discomfort → (-) Brand Attitude | Rational | Survey | Cognitiv e Dissonan ce Theory | - | (Chang , C., 2011) |
| • Cluster Analysis based on:<br>Price Sensitivity, Willingness to Comply to Social Norm, Value, Quality, Perceived Consumer Effectiveness, Advertising Believability, Availability, Inertia, Personal Norms, Organizational Trust, Expertise, Purchase Intentions | Rational | Critical incident technique + Survey | Value-Belief Norm Theory | All products | (Gleim, M. et Lawso n, S. J., 2014) |
| • Availability → (-) Behavior<br>• Price → (-Behavior)<br>• Preference for specialty stores → (-) Behavior<br>• Taste and Appearance → (-) Behavior | Rational | Survey (open and closed ended questions) | - | Food | (Buder *et al.*, 2014b) |
| • Functional Value Gap → Intention<br>• Functional Value Gap → Behavior<br>• Environmental Impact Value Gap → Intention<br>• Environmental Impact Value Gap → Behavior<br>• Psychological Value Gap → Intention | Rational | Survey | Theory of Consum ption Values | - | (Biswa s, 2017) |
| • Product Specific Attitude → Behavior<br>• Health Orientation → Behavior<br>• Sensory Appeal → Behavior<br>• Moderators:<br>Future Orientation x Attitude →Behavior | Rational | Survey | TPB | Food | (Cheki ma *et* |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Future Orientation x Health orientation → Behavior | | | | | *al.*, 2017) |
| • Intention → Plans → Behavior<br>• Moderators:<br>Environmental Involvement (between Plans and Behavior)<br>Actual Behavioral Control (between Plans and Behavior)<br>Shopping Context (between Intentions and Plans ) | | Rational | Survey | TPB | - | (Grimmer et Miles, 2017) |
| • Environmental involvement → Attitude<br>• Informational Utility → Attitude<br>• Green Trust → Attitude<br>• Attitude → Intention → Behavior | | Rational | Survey | Cognitive Behavior Theory | - | (Wei *et al.*, 2017) |
| • Utilitarian Value → intention<br>• Subjective Norm → intention<br>• Perceived Consumer Effectiveness → intention<br>• Environmental Concern → intention<br>• Self-Expressiveness → intention<br>• Utilitarian Value → experience<br>• Perceived Consumer Effectiveness → experience<br>• Subjective Norm → experience<br>• Income → experience<br>• Education → experience | | Rational | Survey | - | Apparel | (Park et Lin, 2018) |

***Table 3.4.*** *Summary of the quantitative articles modeling the gap using a holistic approach*

3.3.4.3.2 Qualitative findings:

The qualitative papers in the subcategory of holistic articles are mainly centered around the barriers causing the green gap, including price, lack of availability, poor quality perception, green image, and the preference of the non-green product attributes (Chiu, 2012; Gleim, M. et Lawson, S. J., 2014; Wiederhold et Martinez, 2018; Young *et al.*, 2010). Prioritizing egoistic benefits and pragmatic heuristics (Chiu, 2012) along with preferring not to engage in the substantial cognitive effort required to choose the green product (Young *et al.*, 2010) are both additional barriers against the green purchase behavior. According to Perry et Chung (2016), there are two types of green gaps: i) the gap between environmental attitude and the act of buying eco-friendly

products, and ii) the gap between an individual's attitude towards a specific green product and the actual act of purchasing it. The distinction between these two gaps highlights a major methodological flaw that most researchers fall into, especially considering the TPB requirement that attitude be contrasted with the actual behavior and not with some other related feature.

### 3.3.5 Methodological bias

#### 3.3.5.1 Methodology and sampling

The category of methodological bias comprises six papers, all of which use quantitative methods. The sample sizes in these papers range between 110 and 17673, and all the samples are heterogeneous, as the authors do not use any filters to target consumers manifesting the green gap. Longitudinal data collection is applied in two studies, either by differentiating the dates of motivational and behavioral (willingness to pay) data collection (Barber *et al.*, 2016) or by using a longitudinal data panel (Schäufele et Hamm, 2018). Most of the studies use self-reported data to analyze methodological bias; however, only two studies adopt real behavioral data, and succeed in minimizing overestimation bias by using real behavior measures (Bamberg, 2003) or panel data (Schäufele et Hamm, 2018).

#### 3.3.5.2 Paradigms and objectives

In general, the papers discuss the factors contributing to the green gap and offer solutions to bridge it (Bamberg, 2003; Barber *et al.*, 2016; Chowdhury et Samuel,

2014). The majority of studies abide by the traditional paradigm of a reasonable consumer; however, one study follows the behavioral paradigm and uses artificial networks to analyze the factors subconsciously driving consumers towards green gap behavior (Chowdhury et Samuel, 2014).

#### 3.3.5.3 Main findings

All the articles included in this category argue that the gap is brought about by some methodological deficiency. One such deficiency is the social desirability bias that acts as a covariate of the relationship between normative belief and willingness to pay (Barber *et al.*, 2016). Overestimation bias is another deficiency that may be associated with the green gap (Schäufele et Hamm, 2018). According to several authors, environmental concerns do not strongly influence the green behavior of consumers; however, products' competitive advantage (Chowdhury et Samuel, 2014), consumers' situated cognition (Bamberg, 2003), behavior-based attitude (Kaiser *et al.*, 2007), and the cognition components of attitude (Lee, H. et Cheon, 2018) are shown to be efficient predictors of green purchase behavior.

| **Relationships between Variables and Main Results** | **Paradigm** | **Method** | **Guiding Theory** | **Green Product-Purchase** | **Paper** |
|---|---|---|---|---|---|
| • Green Attitude → Intention → Purchase<br>• Subjective Norm → Intention → Purchase<br>• Perceived Behavioral Control → Intention → Purchase<br>• *Environmental Concern being a boundary condition for the validity of the model* | Rational | Survey | TPB applied to situated Cognition | Electricity | (Bamberg, 2003) |
| • Behavior-Based Attitude → Behavior | Rational | Survey | Item Response Theory | Food and Energy Appliance | (Kaiser *et al.*, 2007) |

| | | | | | |
|---|---|---|---|---|---|
| • Product Attributes → Behavior (Brand, Model, Price, Promotional offers, Efficiency, Maintenance) | Behavioral | Survey | TPB and Social Dilemma Theory | Energy Products | (Chowdhury et Samuel, 2014) |
| • Normative Belief → Willingness to Pay<br>• *Covariates: Perceived Consumer Effectiveness and Social Desirability Bias* | Rational | Experiment | Normative Theory | Wine | (Barber *et al.*, 2016) |
| • Cognitive Predictor → Attitude<br>• Cognitive Predictor → Behavior<br>The Cognitive Predictor has more weight than the Affective Predictor in the model | Rational | Survey | Theory of Attitude | Energy Products, Food and others | (Lee, H. et Cheon, 2018) |
| Comparing real behavior with self-reported one show that the gap is caused by over-estimation bias | Rational | Survey | Theory of Consumer Behavior-TPB | Wine | (Schäufele et Hamm, 2018) |

***Table 3.5.*** *Summary of the studies tackling methodological bias.*

### 3.3.6 Prioritizing the self

#### 3.3.6.1 Methodology and sampling

Among the retrieved papers, three tackle the theme of prioritizing the self through quantitative methods. All three papers use non-filtered samples comprising both, green and non-green consumers, as well as green gappers. Sample sizes vary between 296 and 2773.

#### 3.3.6.2 Paradigms and objectives

The three papers seek to explain the reasons behind the gap, and they all follow the traditional paradigm of the reasonable man and planned behavior.

#### 3.3.6.3 Main findings

The main argument in this category's papers is that attitude is weakly linked to intention and behavior, unless it is coupled with other variables that are related to the consumer's self. For example, consumers that possess self-transcendent values are more likely to exhibit green behavior than those who don't (Jacobs *et al.*, 2018). The effect of these values on behavior is both, direct (main effect) and indirect (mediated by attitude). On the other hand, self-enhancement values negatively influence green behavior via the mediation of attitude (Jacobs *et al.*, 2018). Altruism, perceived consumer effectiveness, happiness, and status enhancement are established as factors that affect green purchase intentions positively by mediating the attitude (Reimers *et al.*, 2017). Finally, Martenson (2018) shows that self-awareness has a significant effect on consumer's willingness to pay for the green alternative. This effect is mediated by cost-consciousness and green purchasing habits.

Interestingly, despite the common belief that gap bridging may only be achieved via behavioral strategies (Groening *et al.*, 2018), the studies in this category suggest that solutions based on self-awareness and cost-consciousness, both of which are rationalistic variables, may also be effective.

| **Relationships between Variables and Main Results** | **Paradigm** | **Method** | **Guiding Theory** | **Green Product-Purchase** | **Paper** |
|---|---|---|---|---|---|
| • Altruism → Attitude<br>• Perceived Consumer Effectiveness → Attitude<br>• Happiness → Attitude<br>• Status Enhancement → Attitude<br>• Attitude → Intention | Rational | Survey | Psychographic Variables | Apparel | (Reimers *et al.*, 2017) |

| | | | | | |
|---|---|---|---|---|---|
| • Self-Transcendence value → Attitude → Behavior<br>• Self Enhancement → (-) Attitude → (-)Behavior | Rational | Survey | Value – Attitude – Behavior Hierarchy | Apparel | (Jacobs *et al.*, 2018) |
| • Self-Awareness → Cost Consciousness → WTP<br>• Self-Awareness → Green Purchasing Habits → WTP | Rational | Survey | Multiple Selves Phenomenon | Vehicles | (Martenson, 2018) |

***Table 3.6.*** *Summary of the articles tackling self-prioritization variables*

### 3.3.7 Coping mechanisms

#### 3.3.7.1 Methodology and sampling

Four papers establish that consumers use coping mechanisms to justify the incoherence of their actions. These papers are qualitative papers that use either interviews (Gruber, V. et Schlegelmilch, B. B., 2014; McDonald *et al.*, 2015) or focus groups (Atkinson et Kim, 2015; Johnstone, M. L. et Tan, L. P., 2015a) to assess the coping mechanisms of a sample that varies between 21 to 51 participants. Considering that only individuals manifesting the green gap are targeted, a purposeful sampling method is used to identify these individuals in three studies (Gruber, V. et Schlegelmilch, B. B., 2014; Johnstone, M. L. et Tan, L. P., 2015a; McDonald *et al.*, 2015)

#### 3.3.7.2 Paradigms and objectives

The main goal of the four papers is to explain the mechanisms that help consumers cope with their incoherent actions *after* performing them. It is not easy to identify the dominant paradigm in the papers, since all four of them highlight the behavioral aspect of falling into the gap (behavioral paradigm), and at the same time,

they declare that the gap is an inconsistency (traditional rational paradigm). Considering that the behaviors are post-rationalistic, the papers are placed under the rational paradigm.

#### 3.3.7.3 Main findings

The studies in this category report that consumers use neutralization techniques, such as denial of responsibility, denial of injury (Atkinson et Kim, 2015; Johnstone, M. L. et Tan, L. P., 2015a), appeal to higher loyalties (Johnstone, M. L. et Tan, L. P., 2015a), and condemning the condemner (Gruber, V. et Schlegelmilch, B. B., 2014), as means of coping with their actions. Of these techniques, three are related to the context, namely, the defense of necessity (McDonald *et al.*, 2015), protecting one's sense of self, and attachment to certain brands (Johnstone, M. L. et Tan, L. P., 2015a). Consumers also justify their acts by arguing about the context and nature of the product they are buying (flight behavior). In some cases, the neutralization techniques are countered by greener behaviors (under certain circumstances) and reduced non-green purchases (McDonald *et al.*, 2015). However, the repetitive use of these techniques generally promotes disoriented behavior in society; people become indifferent of their wrong doing overtime (Gruber, V. et Schlegelmilch, B. B., 2014).

This concludes the systematic literature review. In the following section, future research avenues are suggested and discussed.

## 3.4 Future research avenues

In the previous section, we assembled the different factors reported to have an influence (positive or negative) on the gap between attitude and intention to buy a green product on one hand and the actual behavior of buying it on the other hand. This was accomplished by organizing and categorizing the papers reviewed herein, based on the framework suggested by Carrington *et al.* (2016). Fig. 1 presents a scheme of the different categories of papers. The intrapsychic and contextual factors, as well as the the factors related to methodological bias and prioritizing the self promotion the green gap are listed on the left side of the figure. These factors positively contribute to the existence of the gap, hence the plus sign on the arrows (+). Meanwhile, the same type of factors contributing to the elimination of this gap are listed on the right side of the figure. These factors negatively contribute to the existence of the gap, hence, the negative sign on the related arrows (-). These factors can be adopted in interventions to reduce the gap and ultimately, to bridge it. As for coping mechanisms, and considering that they indirectly promote the gap between intention and behavior, they are listed on the left side of the figure. An overview of the assembled variables shows that the intrapsychic and contextual factors have already been extensively analyzed. Building on this overview, we suggest new research avenues related to both types of factors (positively- and negatively- influencing the green gap). These avenues are listed in the framework of Fig. 1 in *italicized* text.

## 3.5 Modeling the gap

### 3.5.1 Intrapsychic factors

In the context of green behavior, the TPB focuses on attitude, subjective norms, and perceived behavioral control as intrapsychic factors influencing the act of purchasing (Ajzen, 1991). However, it has been shown that the incorporation of additional psychological factors enhances green gap predictions. Habits, for instance, play an important role in driving consumers towards a particular purchase (Maréchal, 2010). Furthermore, the hedonic and egoistic values implicated in purchasing certain types of products (clothing, vehicles, cosmetics…) cannot be replaced with the altruistic values favoring the purchase of the green alternatives (Jacobs *et al.*, 2018; Martenson, 2018; Reimers *et al.*, 2017). Hence, both types of values must be taken into consideration when attempting to predict green behavior. Similarly, the act of buying green merchandise is strongly and negatively affected by the consumer's perception of the green purchase (Johnstone, M. L. et Tan, L. P., 2015a). Implicit and explicit measurements are needed to provide a profound understanding of people's green perceptions. The factors affecting green perceptions, such as generation, perceived compromises (compromise thresholds for buying green products), and perceived utility, should also be investigated.

The mental representation of the alternative green product may also be used to explain the gap. To determine whether the green gap may be brought about by

temporal, distal, social, and/or hypothetical mental representations, the environmental representation (Trope et Liberman, 2010) should be contrasted with that of the green product using the Construal Level Theory (Johnstone, M. L. et Tan, L. P., 2015b; Reczek *et al.*, 2018). Studies are needed to confirm this hypothesis. Furthermore, studies should be performed to assess the individual and social interactions leading to these representations. This could help alleviate the gap problem for future generations through advertising, media, and public communication (Akaka et Alden, 2010). Time-inconsistent preferences and behavior (Hoch et Loewenstein, 1991) are additional factors that merit investigation in the context of the green gap.

Previous studies have shown that the green gap could be effectively bridged simply by manipulating the internal factors in TPB. Similarly, interventions that reinforce attitudes, subjective norms, and perceived behavioral control (Litvine, D. et Wüstenhagen, R., 2011), as well as those that enhance intentions with plans (Loy, L. S. *et al.*, 2016), have the potential to overcome the gap. Interventions that manipulate the time window of the purchase (Aggarwal et Vaidyanathan, 2003; Manzoor et Akoglu, 2017) are particularly effective (Aggarwal et Vaidyanathan, 2003). Examples of such interventions include coupons with a limited expiration date, limited time promotions, or on the spot testing of the product. We propose that in the future, researchers use the Prospect Theory (Kahneman et Tversky, 1979) to investigate the roles of concepts such as loss aversion, temporal discounting, mental accounting (Schütte et Gregory-Smith, 2015), risk-taking, and decision making under uncertainty

(Maule *et al.*, 2000), in contrasting two applications, namely, the environmental crisis (being temporally discounted) and the purchase of environmentally friendly products (replacing the conventional product and hence, causing a sense of loss). Interventions in this context can help evaluate the capacity of behavioral premises in triggering desired reactions. Although the behavioral paradigm is now pushing towards nudging the consumer's subconscious, building on the rational paradigm and encouraging the consumers self-awareness might also be key to promoting the green purchase.

### 3.5.2 Contextual factors

According to Bamberg (2003), attitude is not the sole determinant of environmentally friendly behavior. In addition to this variable, contextual factors constitute important parameters that affect the green gap, either positively or negatively. Therefore, these factors should be investigated thoroughly in order to provide a better understanding of the green gap phenomenon and to offer effective solutions for this gap.

Marketing mix factors and societal factors are among the primary contextual variables that have been used to explain the gap between green intentions and behaviors. In particular, incentives and pricing strategies play an important role in encouraging purchase behavior (Simonson et Drolet, 2004), and thus, they should be investigated more thoroughly in the future. This is particularly true considering that price anchors are not usually set by the green industry. Moreover, in order to account

for the growing role of influencers, new communication strategies should be developed, as suggested by Johnstone et Lindh (2018) and Groening *et al.* (2018). These strategies could help redirect a consumer's impulsive tendency to imitate the influencer towards a more sustainable purchase behavior. To encourage the purchase of green products, it is also necessary to align the packaging standards of these products with those of the non-green alternatives. We also believe that the use of salient messages and dynamic interactive tools, such as free trial kiosks and price comparison screens, at the marketplace (Kiran *et al.*, 2012) could drive customers to buy the alternative green products. More research is needed to validate this hypothesis. Eco-labels constitute an additional contextual factor that has not been sufficiently examined in the context of the green gap, even though its effect on green consumption has been well established (Osburg *et al.*, 2019).

Green consumption research that addresses the emotional aspect of the purchase usually focus on negative emotions, such as guilt (Antonetti et Maklan, 2014; Jiménez et Yang, 2008). Exploring the effects of positive emotions, such as pleasure (Kwortnik Jr et Ross Jr, 2007) and humor (Weinberger et Gulas, 1992), on green purchase is also an interesting avenue of research.

In the age of technology, high-tech tools constitute an effective means of promoting green purchase behavior, particularly in the young generation, and thus, they should not be neglected (Johnstone et Lindh, 2018). For example, video games, like prosocial games (Gentile *et al.*, 2009), could be used to alter consumers' negative

perceptions of green consumption and to encourage green purchase behavior. Moreover, the use of digital applications to highlight offers and promotions pertaining to green products is also interesting in bridging the gap. To confirm these hypotheses, more research studies should be conducted on the effects of high-tech tools on a consumer's green behavior.

Previously, it has been shown that learning models can efficiently promote, recommend, and force new habits of consumption (Verplanken et Wood, 2006). New studies are needed to show whether this concept can be applied to green consumption. In particular, the studies should investigate whether the traditional reinforcement learning model or new models, such as intention-based neural networks (Ding *et al.*, 2015), can push consumers towards purchasing green merchandise.

In the field of health and wellbeing, behavioral nudges have shown good efficiency in altering individuals' demeanor (Thaler et Sunstein, 2009). Therefore, these nudges can potentially improve consumers' behavior in terms of green purchasing. In fact, several cases of successful application of green nudges have been previously documented (Singler, 2015), and further exploration of this idea can prove fruitful in bridging the gap. The concept of "boost" (Grüne-Yanoff et Hertwig, 2016) that builds on the existing competencies and knowledge that consumers have regarding the green product can also be tested to resolve the green gap.

## 3.6 Methodological factors

As discussed earlier, there exists a series of methodological bias factors that contribute to the green gap. Social desirability bias is one such factor that has been shown to influence what consumers say regarding green consumption (Barber *et al.*, 2016). Considering that consumers generally tend to exaggerate their intentions, it is necessary to develop a measurement tool that accounts for consumers' stated preferences, as well as for the possibility of exaggeration. When equipped with the right components (intrapsychic and contextual variables), such a tool could effectively minimize the gap and limit its consequences. The control variables used to measure overestimation and desirability bias (Van de Mortel, 2008), as well as those that assess attitude (Beattie et Sale, 2016), can also help resolve the issue of the green gap, and thus, they should be investigated further.

In addition to adding the right components, it is also important to adjust the methodologies already in use. Previously, it has been shown that the cognitive and conative components of attitude exhibit a greater effect on pro-environmental purchase behavior than the affective components (Kaiser *et al.*, 2007; Lee, H. et Cheon, 2018). Therefore, in order to obtain more reliable results, the attitudinal components should not be treated equally. Instead, new measurement tools should be developed so as to account for the different contributions of the two types of components. Moreover, considering that attitude might not be as predictive of behavior as other variables, it

should not be treated as the main contributor to green behavior, which actually limits methodological bias.

It should be noted that when assessing methodological factors, it is essential to distinguish between attitude towards the environment and attitude towards green product consumption, as the measured constructs are far from being the same (Perry et Chung, 2016). This issue has already been discussed in the section entitled “Modeling the gap : holistic articles”. An examination of the differences and similarities of the constructs could help optimize behavior predictions.

Finally, considering that the step of testing for the existence of the green gap in participants is neglected in many studies (Claudy *et al.*, 2013; Jacobs *et al.*, 2018; Shepherd *et al.*, 2005; Tung *et al.*, 2012), it is necessary to establish a standardized protocol to be followed by all researchers tackling the green gap. We suggest that this protocol elaborates a method of testing for the level of greenness (Kulshreshtha *et al.*, 2017) or for inconsistent behavior (Gruber, V. et Schlegelmilch, B. B., 2014). Such a protocol is guaranteed to ameliorate the quality of the sample and thus, enhance the validity of the results and their relevance to the green gap.

### 3.7 Prioritizing the self

In some contexts, consumers behave egoistically by prioritizing their own needs, as well as their psychological and physical wellbeing, over altruistic values and behaviors such as green purchase (Jacobs *et al.*, 2018; Martenson, 2018; Reimers *et al.*,

2017). The rationalistic preference and utility maximization schemes highlighted by such egoism indicate that: in order to be effective, solutions of the green gap must be perceived as personally beneficial.

Currently available studies discuss self-prioritization factors as variables contributing to the existence of the green gap (presented on the left side in Fig. 1). We propose that these factors could be used to bridge the gap instead of widening it (shifting the factors to the right side, as shown in Fig 1). Specifically, new strategies must be designed so as to align the consumers' self-interest and personal gain with ecofriendly behavior. In other words, the alternative green product should be promoted as a utility maximizing option, rather than as a pro-social solution.

Digital schemes of intervention, such as games (Gentile *et al.*, 2009), should also be investigated as a means of bridging the green gap. The inclusion of the "fun" aspect helps to transform perceptions, intentions, and attitudes by triggering positive responses and emotional appeal (Lee, J. et Hong, 2016). This ultimately promotes the attachment to the green concept and the green product.

### 3.8 Coping mechanisms

To cope with the discomfort generated by the inconsistency between their green attitudes and behaviors, consumers use certain psychological mechanisms. These coping mechanisms help consumers to neutralize their guilt, justify their behavior, and generally, feel better about themselves (Atkinson et Kim, 2015; Gruber, V. et

Schlegelmilch, B. B., 2014). Although the mechanisms may drive consumers to compensate for their green gap behavior in another context (McDonald *et al.*, 2015), they typically undermine personal and societal values related to the green consumption (Gruber, V. et Schlegelmilch, B. B., 2014). Furthermore, continuous justification helps to maintain the inconsistent behavior, i.e. the green gap over time, even if these justifications don't affect the gap directly.

In the future, research attempts should focus on the factors and conditions contributing to positive green compensation behavior, particularly personality traits (Digman, 1990). The factors that help maintain a passive state of inconsistent behavior should also be investigated. Moreover, social theories of behavior, such as the Lifestyle Exposure Theory (Hochstetler et DeLisi, 2005), should be used in conjunction with the Neutralization Theory, especially in situations where the victim analogy applies.

Coping mechanisms operate on the subconscious level; however, it might be useful to be aware of their existence. Therefore, developing intervention techniques that trigger and activate self-awareness (Su, 2016) might prove effective in minimizing the gap. Triggering self-awareness is considered an intervention manipulating intrapsychic variables and has been placed therein in the framework (Figure.1) on the left side of the green gap.

## 3.9 Discussion

This review highlights important aspects concerning the green attitude-intention-behavior gap. Most importantly, it identifies opportunities for future research endeavors aiming towards a more sustainable purchase behavior. In this section, we discuss the implications of this research on the green gap, the complementarity of the two main research streams, the controversy between the attitude-behavior and the intention-behavior gaps, and the importance of analyzing the gap.

### 3.9.1 What does this review say about the green gap?

The articles reviewed in this paper are those concerned with the analysis of the factors promoting the green gap, as well as those attempting to bridge it. Studies of the coping mechanisms that indirectly endorse the persistence of the gap are also included. Overall, the review suggests that the green gap phenomenon cannot be resolved in the near future, and as such, it should continue to be extensively researched. This is particularly true considering that the gap is continuously evolving due to the constant changes imposed on consumers by modernization.

On the micro-level, consumers are not yet ready to prioritize the environment over their personal wellbeing and pleasure. Rationalistic techniques of coping have helped consumers experiencing the green gap to accept their inconsistent behaviors, thereby promoting a social norm that is indifferent towards the environment (Gruber, V. et Schlegelmilch, B. B., 2014). This effect is reinforced by negative perceptions of

green behavior, green product efficacy, and green people, as well as by the lack of trust towards green industries, the lack of social awareness, and the lack of environmental consciousness. The greater competitive advantage of the conventional non-green product, compared to the green alternative, is an additional factor contributing to the green gap. Society is yet another factor that restricts green behavior by encouraging non-sustainable lifestyles. Consequently, despite their positive attitudes, intentions, and values, consumers are a long way away from sustainable living.

On the academic level, the factors impacting the green gap, either positively or negatively, are being extensively examined by researchers in the field of environmental psychology and related disciplines. The data available so far is substantial enough to allow for applications and interventions that narrow the gap. The future research opportunities suggested in this work investigate different means of accelerating the shift towards green behavior.

On the long run, sustainable consumption is expected to garner greater attention, due to increasing governmental and organizational efforts in spreading awareness. Therefore, it is necessary to constantly examine the green gap, both, qualitatively and quantitatively, in an attempt to understand its evolution and to adapt the interventions and environmental actions accordingly.

### 3.9.2 Why focus on the gap?

Some believe that the gap is a behavioral concept that can be resolved by behavioral insights (Groening *et al.*, 2018). So, why is it that researchers are still concerned with attitude and intention? To answer this question, one must first consider important aspects of the green gap research. First, most research studies use the economic rational paradigm to investigate the green gap phenomenon mainly through the TPB. The dominance of this rational paradigm can consequently be the very cause of the green gap, considering that the gap is brought about by a rational model that forces a certain alignment between attitudes, intentions, and behaviors. Based on these studies, one can conclude that behavioral insights are indeed the key to solving the complication of the green gap. However, behavioral insights rely on the unconscious rather than deliberate human agency. It is the rational paradigm that focuses on consumers 'ability to consciously acknowledge the problem and willingly work towards a solution. In fact, cultivating knowledge and awareness can be and has proved to be an effective means of altering behavior, and so, it is another important aspect of green gap research. The question therefore is the following: of the two aspects, which one is more capable of pushing consumers towards green purchase: the conscious (awareness) or the subconscious (behavior)? And how is this related to the green gap?

In terms of behavior, consumers are divided into two groups: those who purchase, and those who do not. However, in terms of the green gap, the categories of consumers are more diverse, since attitude and intention need to be taken into

consideration, as well as behavior. Thus, to answer the question, one must consider the different types of consumers and the degree of their commitment to the sustainable lifestyle. For example, consumers who do not purchase green products (non-green consumers) respond better to behavioral interventions and nudges that trigger their unconscious responses (behavioral paradigm) than those who do [ See for example Bodur *et al.* (2015); Maréchal (2010)]. Meanwhile, consumers who normally exhibit green attitudes and behaviors (green consumers), but occasionally refrain from buying the green product, respond well to interventions that speak to their cognitive entity and build upon their existing knowledge (rational paradigm) [See for example Moraes et al., 2012 and Torma et al., 2018)]. Finally, the green gappers who fall in between green and non-green consumers are responsive to both types of interventions and paradigms (behavioral and rational) [See for example Barber *et al.* (2016); Zapico *et al.* (2016)], and so, they constitute suitable targets for analyzing the antecedents, reasons, and circumstances leading to the onset on the green gap. Once the consumers are properly categorized, the appropriate paradigm may be adopted, leading to more efficient results. Thus, there is not one solution that fits all; the behavioral insights are useful for one segment of the market (the non-greens), and the rational interventions are effective for another segment (the greens). As for the segment in between (the green gapper), a combination of both seems most promising. Fig. 2 illustrates the relationship between paradigm, objective of the study, and the type of consumers targeted.

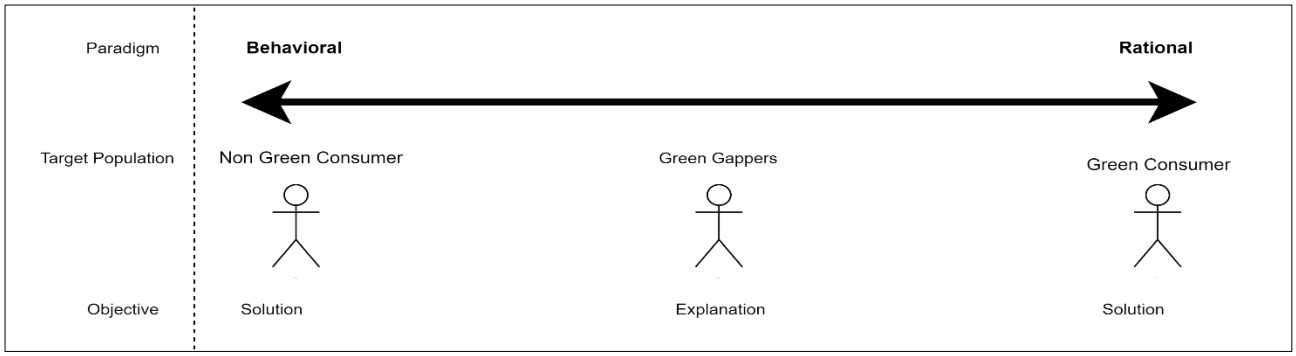


***Figure 3.2.*** *Relationship between paradigm, type of consumers targeted, and the objective sought.*

### 3.9.3 The complementarity of the two research streams concerned with the green gap

According to Frank et Brock (2018), green gap research may be divided into two streams. The first stream of research is concerned with methodological bias, whereas the second has to do with modeling the intrapsychic, contextual, and self-prioritization factors. Interestingly, our review highlights the complementarity of the two streams, even though they are tackled separately in different sets of articles. In fact, each article reviewed herein focuses on one type of variables affecting the gap, except for a few that integrate the methodological and modeling approaches to green gap research (Barbarossa et Pastore, 2015; Bodur *et al.*, 2015; Frank et Brock, 2018; Gruber, V. et Schlegelmilch, B. B., 2014; McDonald *et al.*, 2015). Although the different types of variables are discussed separately in this review, we suggest that the holistic approach is best suited for understanding and resolving the green gap phenomenon.

### 3.9.4 Attitude-behavior vs intention-behavior gap

The terms “attitude-behavior gap” and “intention-behavior gap” both refer to the green gap and accurately describe it. To differentiate between the two labels, title-content analyses were performed on the reviewed articles. The obtained results show that of the 12 articles referring to the gap as an attitude-behavior gap, five are purely qualitative studies that interpret attitude differently. For example, Moraes *et al.* (2012) consider that attitude is shaped based on several factors, including information and knowledge. Meanwhile Wiederhold et Martinez (2018) define attitude as positive or negative feelings towards the issue or object at hand. According to Padel et Foster (2005), attitude has to do with preferences, perceptions, and information. As for the quantitative studies, they all refer to attitude as an evaluative psychological construct. Nevertheless, the attitudinal assessments are performed differently in different studies. For example, Jacobs *et al.* (2018) measure attitude based on the products’ environmental and social attributes, whereas Lee, H. et Cheon (2018) measure it using cognitive and affective evaluations.

The papers referring to the gap as an intention-behavior gap either follow the behavioral or the traditional rational paradigm. The former focuses on consumers’ behaviors rather than their attitudes and considers that intentions constitute a better target of intervention than attitude (Frank et Brock, 2018; Momsen et Stoerk, 2014). As for the latter, it emphasizes the linear and progressive continuity from attitude to intention to behavior (Tung *et al.*, 2012).

In reality, the gap can be analyzed from different perspectives, as it implicates numerous concepts, including preferences, knowledge, evaluations, and intentions. This confirms the need for more integrated and holistic studies of the green gap. Considering that attitude, intention, and behavior are all implicated in the gap, we refer to the gap as the attitude-intention-behavior gap.

## 3.10 Limitations

In this paper, the available studies on the green gap phenomenon were identified, categorized, and systematically reviewed. Based on the results reported in the 58 selected articles, future avenues of research were highlighted. Despite the meaningful contributions of this review, certain limitations do exist. First, some articles could not be easily classified, as they tackle multiple issues or several factors simultaneously. These articles were mostly assigned to the category of "modeling the gap: holistic articles"; however, some of them were put in the "methodological bias" category so as to avoid redundancy. Another limitation is that the review is restricted to the commercial aspect of the green gap (buying green products). To provide a more comprehensive analysis of the gap, both, commercial and non-commercial (ex. waste management and consumption reduction) behaviors should be addressed. The exclusion of articles that deal solely with the motivators and/or barriers of green purchasing behavior also limits the completeness of the review. However, this limitation can be justified by the need to focus our work on a clearly defined subject, which is the green gap. Finally, since the quantitative studies included in the review

outnumber the qualitative ones, it would have been prudent to conduct a meta-analysis of the numerical data. This would have allowed for contrasting the magnitudes of the effects of different variables analyzed in different studies. Furthermore, the incorporation of articles addressing the barriers against green purchase would definitely add great value to such meta-analysis.

## 3.11 Conclusion

The work presented herein reviews 58 articles tackling the issue of the attitude-intention-behavior gap evident in green consumption. These studies were categorized based on the framework proposed by Carrington *et al.* (2016), and the methodologies and paradigms adopted in each study were examined. Overall, the review shows that researchers typically use modeling techniques to determine why consumers are reluctant to buy the green product. The incorporation of intrapsychic as well as contextual variables in the model allows for a better understanding of the factors contributing to the gap. Several theories may be adopted for future green gap analysis, including TPB, Prospect Theory, Social Dilemma Theory, Self-Awareness Theory, and Situated Cognition Theory, among others. An overview of the reviewed articles suggests that more research is needed in the areas of 1) methodological errors (ex. desirability bias and overestimation bias), 2) self-prioritization, and 3) coping mechanisms. Moreover, the results reported in the published articles indicate that the green gap will not desist in the near future, neither as a phenomenon, nor as a research subject. However, considering the continuous changes in lifestyles, the green gap is

likely to evolve over the years. Therefore, the methodologies used to study this gap must be diversified, and more qualitative and quantitative analyses should be performed. Furthermore, segmentation is key for the choice of paradigm for both studies and interventions; the behavioral paradigm is most adopted for non-green consumers, whereas the rational paradigm works better for green consumers. This will hopefully allow the application of higher efficiency interventions leading to more sustainable behavior. To the best of knowledge, ours is the first review presenting state of the art research in the domain of the green gap from the perspectives of theory, methodology, and paradigm.

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## 3.13 Appendices

### 3.13.1 Appendix 1: Descriptive statistics

To make sense of the collected data, a descriptive analysis was conducted on the 58 retrieved articles, and each paper was given a specific description (year of publication, journal, methodology, purpose, sample size, country, and business sector) using Excel. A bibliographic analysis of authorship networks was also conducted using VOSviewer.

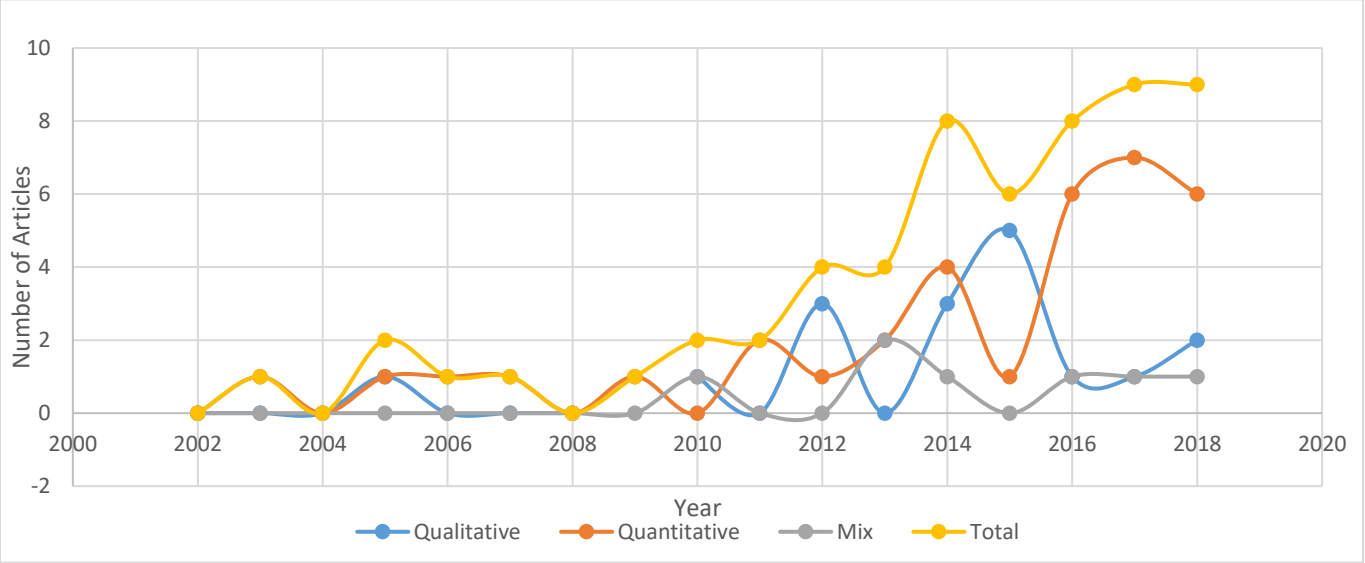



***Figure 3.3.*** *Temporal distribution of articles based on the type of methodology used.*

As shown in Fig. 3, the total number of articles published on the green gap has generally increased with time. The first studies were published in 2003, and they were only two studies. As the years progressed, the number of publications fluctuated until 2015. In 2017 and 2018, a total of nine articles were published yearly on the subject of the green gap. The articles are qualitative, quantitative, or both. According to Fig. 3,

the qualitative studies peaked in 2012 and 2015. Interestingly, the quantitative studies peaked after the qualitative ones, specifically in 2014 and 2017. This suggests that quantitative studies build upon the qualitative ones. With an overall ascending trend, Fig. 3 indicates that interest in the phenomenon of the green attitude-behavior gap is growing. Of the 58 articles retrieved herein, 34 (59%) use quantitative methods, 17 (29%) use qualitative methods, and seven (12%) use a mixture of both.

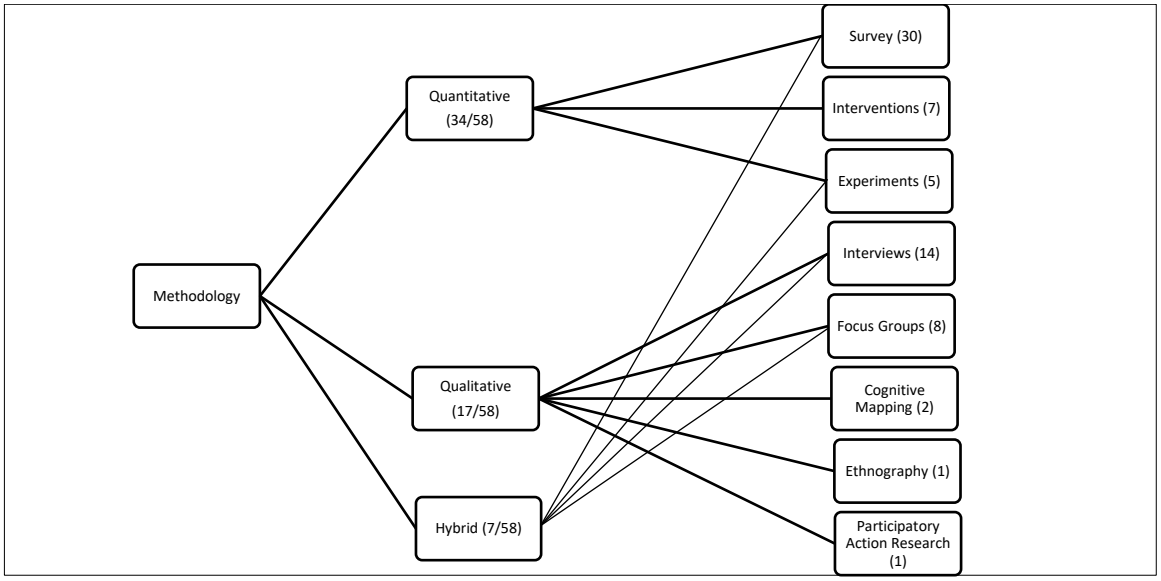



***Figure 3.4.*** *Tree diagram illustrating the methods used in the reviewed studies.*

Qualitative research studies mostly rely on interviews (14) to assess the green gap. Some of these studies make use of focus groups (8), cognitive mapping (2), ethnography (1), and participatory action research (1). The

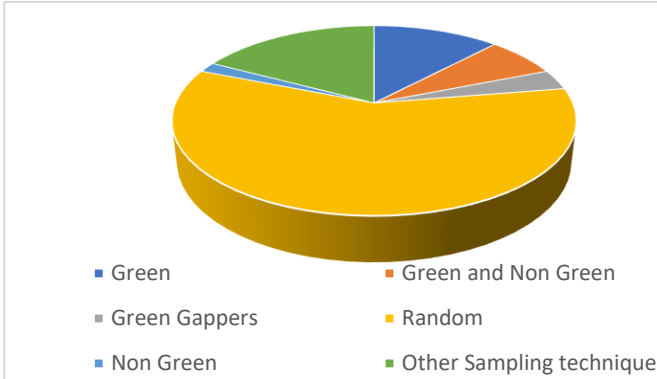



***Figure 3.5.*** *Pie chart showing the different types of consumers sampled in the retrieved articles.*

quantitative papers, on the other hand, are less diverse in terms of methods. Thirty quantitative articles use surveys, seven implement interventions, and five apply experiments. Again, this reflects the impact of mainstream consumer research on the employed methods.

Although all retrieved studies focus on the green gap phenomenon, only two studies test for the existence of the green gap in their sample of participants. In most studies (34), randomized samples are used. However, some articles (4) deliberately focus on both green and non-green consumers, while others are concerned with the green consumer alone (7), or the non-green consumer alone (1). The remaining studies (10) use filters to categorize participants based on the degree of greenness, familiarity, and experience.

| | | *Paradigm* | | *Objective* | | |
|---|---|---|---|---|---|---|
| | | *Rational* | *Behavioral* | *Explanation* | *Solution* | *Both* |
| 1. Methodological Bias | | 5 | 1 | 6 | 0 | 0 |
| 2. Prioritizing the Self | | 3 | 0 | 3 | 0 | 0 |
| 3. Coping Mechanisms | | 4 | 0 | 4 | 0 | 0 |
| 4. Modeling the Gap | a) Intrapsychic variables | 10 | 1 | 8 | 3 | 0 |
| | b) Contextual variables | 12 | 8 | 10 | 8 | 2 |
| | c) Both | 14 | 0 | 14 | 0 | 0 |
| Total | | 48 | 10 | 45 | 11 | 2 |

***Table 3.7.*** *Article distribution based on the paradigm adopted and the objective sought.*

The majority of the studies (45) identified in this review seeks an explanation of the green gap. However, 11 studies aim to find or implement solutions, and two engage in both objectives. This suggests that research on the green gap has not yet

matured enough to begin applying solutions. As for paradigm, the traditional rational paradigm is dominant (48 of 58 articles), with only 10 papers using the behavioral paradigm.

Overall, the studies span 20 countries, with many assessments being conducted in Europe and North America, but virtually no research in Africa or the Middle East. This is mostly due to the fact that the biggest markets of organic consumption exist in European and North American countries (Willer et Lernoud, 2017). In the rest of the world, these markets are still emerging, and they have not yet fully matured.

In terms of product types, 14 studies are concerned with foods, 10 with electronics, nine with energy systems, six with clothing, six with groceries, two with green cosmetics, and six with other products. As for the rest of the studies (7), it is impossible to demarcate the specific product targeted. Such lack of product specification undermines the utility of the results, especially that determinants of green purchasing behavior vary across different product categories (Liobikienė et Bernatonienė, 2017).

Using the VOSviewer software, we were able to identify the authors who contributed to more than one study in this review. These authors are Micael-Lee and Lay Peng Tan, both of whom have published two articles on the subject of the green gap (one of which is cited 103 times according to the google citation index[3] (Johnstone,

[3] As per 16 August 2019

M. L. et Tan, L. P., 2015b)), as well as Hamm Ulrich who participated as a third author in one study (Buder *et al.*, 2014b), and as a second author in another study (Schäufele et Hamm, 2018). Although a bibliometric analysis is not within the scope of this review, it is interesting to note that a multitude of authors are engaged in studying the green gap phenomenon and that most of these authors are not committed to the subject in the long term. Further investigation is needed to determine whether this may be attributed to a lack of interest or to the association between the green gap and other research subjects such as motivations and barriers of purchasing green products.

### 3.13.2 Appendix 2: Details from the literature review process

| Concept 1 | | | Concept 2 | Concept 3 | Concept 4 |
|---|---|---|---|---|---|
| **Psychological Phenomenon** | | | **Agent** | **Domain 1** | **Domain 2** |
| **Attitude** | Behavior* | Gap | Consumer | Environmental | Product |
| **Value** | Behaviour | Inconsistency | Consumption | Sustainable | Commodity |
| **Valuing** | Action | Discrepancy | Purchase | Green | Merchandise |
| **Intention** | Purchase | (3) | Purchasing | Organic | Brands |
| **Concern** | (4) | | Buying | Biological | Device |
| **Belief** | | | Buyer | Environmentally-friendly | Food |
| **Norm** | | | (6) | Pro-environmental | (6) |
| **(7)** | | | | Cleaner | |
| | | | | Ecological | |
| | | | | (9) | |

**Table 3.8.** Words Truncations for the initial articles search

**Table 3.9.** The number of articles retrieved from each database.

| *Keyword Combinations* | *Scopus* | *Web of science* | *Total* |
|---|---|---|---|
| *7×4×3×6×9×6* | 481 | 654 | 1146 |

**Table 3.10.** The journals and disciplines in which the retrieved papers were published.

| DISCIPLINE | JOURNAL | NUMBER OF ARTICLES |
|---|---|---|
| **BUSINESS** | *Journal of Business Ethics* | *2* |
| | *Journal of Business Research* | *1* |
| **ENVIRONMENTAL SCIENCE** | *Journal of Cleaner Production* | *3* |
| | *Ecological Economics* | *2* |
| | *Climatic Change* | *1* |
| | *Electronic Green Journal* | *1* |
| | *Environmental Communication* | *1* |
| | *Environmental Science and Pollution Research* | *1* |
| | *International Journal of Climate Change Strategies and Management* | *1* |
| | *Journal of Agricultural and Environmental Ethics* | *1* |
| | *Journal of Human Environment* | *1* |
| | *Sustainable development* | *1* |
| **FASHION INDUSTRY** | *Journal of Fashion Marketing and Management* | *2* |
| | *British Food Journal* | *3* |
| | *Food Quality and Preference* | *1* |

| | | |
|---|---|---|
| | *International Journal of Wine Business Research* | *1* |
| **IT** | *International Journal of Technology and Human* | *1* |
| | *Nordic Conference on Human-Computer Interaction* | *1* |
| | *Technology Forecasting and social change* | *1* |
| **MARKETING** | *International Journal of Consumer Studies* | *3* |
| | *International Journal of Retail and Distribution Management* | *2* |
| | *Journal of Consumer Marketing* | *2* |
| | *Journal of International Consumer Marketing* | *1* |
| | *Journal of Marketing Management* | *2* |
| | *Marketing Intelligence and Planning* | *2* |
| | *Journal of Advertizing* | *1* |
| | *Journal of Consumer Behavior* | *1* |
| | *Journal of Consumer Studies* | *1* |
| | *Journal of International Consumer Studies* | *1* |
| | *Journal of MacroMarketing* | *1* |
| | *Journal of Product and brand Management* | *1* |
| | *Journal of Strategic Marketing* | *1* |
| | *Qualitative Market Research: An International Journal* | *1* |
| | *Journal of Academy of Marketing Science* | *1* |
| **PSYCHOLOGY** | *Journal of Environmental Psychology* | *2* |
| | *Frontiers in Psychology* | *1* |
| | *Psychology and Marketing* | *1* |
| **SOCIOLOGY** | *Social Behavior and Personality: an international journal* | *1* |
| | *Sociologia Ruralis* | *1* |
| **STRATEGY AND POLICY** | *Business Strategy and the Environment* | *1* |
| | *Energy Policy* | *1* |
| | *Forsight* | *1* |

**Table 3.11.** Countries in which the retrieved studies were conducted

| ***Country*** | ***Number of Studies*** |
|---|---|
| ***Australia*** | *1* |
| ***Austria*** | *1* |
| ***Belgium*** | *2* |
| ***Canada*** | *3* |
| ***China*** | *1* |
| ***Denmark*** | *3* |
| ***Germany*** | *9* |
| ***India*** | *4* |
| ***Ireland*** | *1* |
| ***Italy*** | *1* |
| ***Malasia*** | *1* |

| | |
|---|---|
| ***New Zealand*** | *1* |
| ***Norway*** | *1* |
| ***South Korea*** | *4* |
| ***Sweden*** | *4* |
| ***Switzerland*** | *1* |
| ***Taiwan*** | *3* |
| ***UK*** | *5* |
| ***USA*** | *6* |
| ***Blank*** | *2* |

# CHAPTER 4

# THE PERCEIVED GREEN COSTS: A CONCEPTUALIZATION AND SCALE DEVELOPMENT

## Article title: Green… But at What Cost? A Conceptualization and Scale Development of Perceived Green Costs

**Chapter information:**

An article based on this chapter has been accepted for publication in the proceedings of the Academy of Innovation, Entrepreneurship, and Knowledge Conference 2022. It has also been subject for a presentation in two conferences: Sustainable Consumption Research and Action Initiative SCORAI 2020 and The International Sustainable Development Research Society ISDRS 2020.

ABSTRACT

Despite people's growing motivation to consume ecological products, there are still hesitations in action. People perceive costs around the purchase of environmentally friendly alternatives. This study aims to first conceptualize these green costs and then operationalize them in a measurement scale. Following the literature in measurement theory, the authors report the results of six studies in developing, purifying, and validating the perceived green costs scale (PGCS). The PGCS incorporates nine first-order constructs, eight of which amount to a second-order construct: one-time switching costs (SC), and the remaining one represents repeated purchase costs (PC). The PGCS demonstrates reliability of measure, internal consistency, and convergent and divergent validity. Furthermore, the SC construct confirms the PGCS's predictive validity as it significantly predicts actual green purchase behavior. Interestingly, the SC displays a significant mediating effect between green attitude and green behavior, extending the theory of planned behavior in sustainable consumption context.

**Keywords**: Green products, perceived costs, switching costs, purchase costs, scale development, environmental consumption.

## 4.1 Introduction

In an uncertain world with ever-changing consumption landscapes, companies need to understand consumers' decision-making, influences and trade-offs, now more than ever. Specifically, consumers aiming to join the green transformation and replace their consumption patterns with eco-friendly ones represent a challenging subject as every cost in their decision-making counts and can weigh heavily and cause transition failure.

Costs have figured as behavioral barriers preventing consumers from accomplishing their sustainable goals, contributing greatly to the phenomenon of the green attitude-intention-behavior gap (ElHaffar *et al.*, 2020). However, research has barely touched the surface regarding the conceptualization of green costs and their role in countering ecological transitions. Our goal in the current paper is to delve deep into consumers' perceptions of these costs, conceptualize them, and build a measurement scale to quantify them.

To begin with, efforts to assemble and delineate the green purchase costs have mostly been theoretical (for example, Papista et Krystallis (2013)), and empirical endeavors to operationalize them have not yet been undertaken in a distinct approach of scale development and validation. Specifically, when measuring costs in the literature of sustainable consumption, researcher would borrow items from other contexts such as the service marketing literature. Furthermore, when measuring green

costs, there seems to be conflicting approaches, as some researchers would consider green costs as unidimensional (Yang, X. et Zhang, 2020), while other present them as multidimensional (Papista *et al.*, 2018). Consequently, defining the green costs as a construct and creating a scale to measure them comes about as necessary and timely, to resolve the inconsistencies, and to enhance the methods used in sustainable consumption research.

Thus, we present the current work by building on the existing literature and attempting to overcome the limitations mentioned above. We join the effort of Lasarov *et al.* (2019) in casting the spotlight on the aspects *preventing* people from consuming responsibly. Our goal is to conceptualize the perceived green costs, quantify them and validate their role in hindering green behavior. To do that, we follow a scale development methodology Then, through structural equation modeling and logistic analysis, we explore the scale's practical usability and theoretical credibility as we examine its predictive and nomological validity.

By doing so, we make several contributions to both theory and practice. First, we contribute to the *unsustainable* behavior literature with a conceptualization of perceived green costs, complementing therefore the mainstream research focusing on *sustainable* behavior. While both streams of research are crucial to moving forward in the ecological transition, the former is underdeveloped. Thus efforts to resolve the problem underlying unsustainable behavior are timely and must become 'more intentional, comprehensive and systematic' (Prothero *et al.*, 2011).

In addition, this conceptualization and typology should deepen our understanding of the psychological and monetary costs particular to purchasing eco-friendly products. As behavioral costs are constrained to consumption context and cycle (Prothero *et al.*, 2011), creating a typology and scale deriving from the specific green consumption situation is necessary. Therefore, our work differs substantially from that of Lacroix *et al.* (2019), which features the pro-environmental behavior as general and context-independent.

As for theoretical contributions, the current work extends the theory of planned behavior (TPB) to the context of green consumption. In other words, validating the relationships between attitude, intention, and behavior in sustainable consumption situations advances the discussion on the viability of the TPB in this specific context. It further informs the ongoing research on the phenomenon of the green attitude-behavior gap. Also, integrating the new construct of green costs in the TPB model provides evidence on the underlying mechanisms of this green gap phenomenon.

Finally, the scale resulting from this paper is a practical tool for companies, retailers, and policymakers to assess friction in the greening process. Acknowledging frictions and behavioral burdens "help us understand how well' organizations do their job (Madsen *et al.*, 2020), in particular, how well are green organizations branding, communicating and integrating the green alternative in people's lives. Ergo the assessment of green costs allows for incorporating this concern in strategies,

advertising, and awareness campaigns by governmental and non-governmental entities.

In what follows, we first bring about a conceptual background of costs in green marketing literature where we discuss the unidimensionality versus multidimensionality of perceived green costs and we explore the different dimensions figuring in past research. Then, following Churchill Jr (1979)'s paradigm for scale development, we report the results of six empirical studies and introduce the Perceived Green Costs Scale (PGCS). Next, we demonstrate the PGCS's predictive validity by evaluating participants' actual green behavior. Further, through structural equation modeling, we model the scale within the theory of planned behavior to prove its nomological validity. Finally, we discuss the results and conclude the paper with research implications and future directions.

## 4.2 Conceptual Background

The term "costs" appears in the green marketing literature in both relational (Papista *et al.*, 2018; Papista et Krystallis, 2013) and transactional contexts (Pham *et al.*, 2019). Similarly, "perceived barriers" (See for example (Gleim, M. R. *et al.*, 2013; Mkhize et Ellis, 2020; Tan *et al.*, 2016; Yang, X. et Zhang, 2020) is a popular denomination for a seemingly related construct. To grasp the semantic difference between the two words, we consulted Oxford University Press's online dictionary 'Lexico'. A *barrier* is an obstacle that prevents access or progress, while a *cost* is an

effort, loss, or sacrifice necessary to obtain or acquire something (Lexico, 2021b). Indeed, the two constructs are closely related, as one means the obstacle (barrier), and the other represents the effort necessary to surmount it (cost). For instance, a monetary barrier that prevents consumers from buying an eco-friendly product implies existing monetary costs to be endured to acquire the product.

Nevertheless, not all types of barriers entail an actual cost. Gleim, M. R. *et al.* (2013) identify apathy as a barrier against purchasing green products. In this case, apathy (barrier) does not entail a specific cost as the consumer is indifferent towards the green purchase and subsequently would not invest nor tolerate a 'cost'. Put differently, perceived barriers around the purchase are independent of the consumer's intent to buy, while on the contrary, perceived costs occur when consumers have buying intentions.

Acknowledging this notion is essential for our work as we investigate the perceived green costs within the theory of planned behavior network. Our proposition is that perceived green *costs* (and not *barriers*) play a significant role in the green attitude-intention-behavior gap. Hence, when managers target consumers with high green purchase intentions, it would be more valuable and worthwhile to assess and alleviate *costs*, rather than *barriers*, along the consumers' journey. In short, our investigation carefully navigates the green marketing literature in the light of the disclosed notions.

## 4.3 Unidimensional vs. Multidimensional Perceived Costs

In green marketing literature, the operationalization of perceived costs has taken several forms. We distinguish between unidimensional and multidimensional conceptualization. Research assuming the one-dimensionality of green purchase costs translates the construct in its general more abstract sense. A case in point is the recent study of Yang, X. et Zhang (2020), in which perceived costs are referred to as “switching costs” and are defined as the perceived "time, money, psychology, emotion and efforts associated with shifting from non-green to green alternatives". The authors operationalize this construct by administering three items that revolve around this definition (i.e., “It costs me too much to switch to green products).

On the other hand, research admitting the multidimensionality of perceived costs acknowledges various facets of this same construct. To illustrate, consider the study of Papista *et al.* (2018). The costs associated with green products are divided into two second-order constructs: purchase costs and switching costs, each of which is associated with two first-order factors: price and effort (purchase costs) and evaluation and performance costs (switching costs). The measurement of each type of cost is performed through multiple reflective items.

While the two approaches are plausible, multidimensionality is favored for several reasons. We first consider the abstractness vs. the concreteness of the measurement items. Employing a unidimensional scale entails using general item

leaving behind the construct's essential aspects: aspects that can only be captured with specific and particular items. Moreover, we perceive multidimensional scales as strategically more helpful in marketing. For instance, comprehending that "*the time spent on learning about the point of sale* is an important cost for consumers" is more informative than *"time* is an important cost for consumers". Hence a multidimensional scale aids in preserving more information of the measured construct and pours more specificity into the process (Van der Gaag et Snijders (2004) as mentioned by Van Der Gaag et Snijders (2005)). Our current work endorses this view and attempts to regroup the different facets of a multidimensional measuring scale.

## 4.4 Conceptualizing Perceived Green Costs

When purchasing a green product, consumers usually endure several monetary and psychological costs. Specifically, when consumers *first* consider buying a green product, they bear a learning process and acquire information about the product, the available brands, the points of sale, and so on. Furthermore, the *repeated* purchase of the green alternative comes with reoccurring costs, as the product is perceived as more expensive than the conventional one. These two facets of the perceived costs, namely the one-time 'switching costs' and the repeated 'purchase costs', compose our higher-order construct of "perceived green costs". Table 1 summarizes the conceptual delineation and definitions of these costs.

### 4.4.1 Switching costs

Switching costs have been extensively tackled in the relational and service marketing literature, as they positively correlate with loyalty and discourage replacing service providers (Burnham *et al.*, 2003; Jones *et al.*, 2002). In the context of green products, switching from conventional to green products involves several costs such as seeking information about the product, evaluating the available options, bearing uncertainty about product performance and environmental claims, and losing an existing brand relationship with the habitual conventional product's brand.

#### 4.4.1.1 Evaluation, search, and learning costs

Contrary to routinely purchased goods, when deciding to buy a green product for the first time, consumers invest time and effort to search for the suitable alternative, evaluate the different offers, and learn about them (Johnstone, M.-L. et Tan, L. P., 2015). This investment requires considerable 'thinking costs' (Shugan, 1980) that consumers usually avoid, especially in green purchases (Young *et al.*, 2010). Generally, when the product is more expensive or has related performance risks, consumers seek additional information to conclude the sale (Dholakia, 2001). In the case of green products, both these conditions apply. Add to that the green products' lack of availability in convenience stores, which intensifies the time and effort needed (Papista et Krystallis, 2013). Moreover, considerable time is required to accommodate the new green product and make a comparative evaluation relative to its conventional counterpart. These perceived extra time and effort required before

buying a green product discourage green purchase behavior (Pham *et al.*, 2019; Yang, X. et Zhang, 2020).

In this case, we are tackling two types of costs: evaluation costs and learning costs. First, the search and evaluation costs represent the time and effort that consumers spend evaluating and comparing the advantages and disadvantages of the newly adopted product relatively to the old one. With consumers' busy lifestyles, the luxury of time is not always available, and finding it results in goal conflicts (Lacroix *et al.*, 2019) which forestalls the green behavior. Evaluation costs carry substantial cognitive effort and constitute a significant barrier that makes green behavior demanding (Young *et al.*, 2010).

Second, the learning costs include the time and effort needed to acquire enough knowledge about the target product, offers, prices, features, and points of sale. Recently, lack of knowledge has been pointed out as one of the leading 'dragons of inaction' that deter consumers from consuming green (Lacroix *et al.*, 2019).

#### 4.4.1.2 Performance Loss costs

Often, the green alternative is associated with poor quality relative to its brown counterpart (Gleim, M. et J. Lawson, 2014; Wiederhold et Martinez, 2018; Young *et al.*, 2010), and only recently has this assumption been challenged (Chernev et Blair, 2021). Compared to conventional products, which consumers usually use, green products are perceived as less performing. This perception of lesser quality generates a feeling of loss, as if the consumer, when deciding to buy green, gives up

the good quality. We consider this subcategory of costs closely adjacent to the sunk costs.

#### 4.4.1.3 Uncertainty costs

With green products, there are two kinds of uncertainty that consumers endure. The first one is regarding the green claims, also referred to as green skepticism. This construct is amply present in green marketing literature. Green skepticism is a direct result of greenwashing, and it influences information-seeking behavior, purchase intention (Leonidou et Skarmeas, 2017; Nguyen *et al.*, 2019), and purchase behavior (Cheng *et al.*, 2020). We do not include this construct in our scale development process, as it has already been operationalized in the literature.

The second type of uncertainty is related to the functional aspect of the product, i.e., the perception of the likelihood that the green product will be less efficient (Jones *et al.*, 2002). Conceptually, this construct differs from the *Performance loss costs* in that the first is likely, while the latter is definite. With the lack of information, perception of poor quality, and skepticism towards the green brands (Cheng *et al.*, 2020; Lacroix *et al.*, 2019; Wiederhold et Martinez, 2018), uncertainty costs become a prevalent cause inhibiting green behavior. Empirical evidence further confirms that uncertainty leads to lower levels of sustainable consumer behavior (van der Wal *et al.*, 2018).

#### 4.4.1.4 Brand relationship loss costs

Replacing a conventional product with a green alternative requires getting familiar with the new product and the new green brand. It also means that the conventional brand is being left behind. Brand relationship loss has been tackled in service marketing, along with personal relationship loss when consumers attempt to switch from one provider to another (Burnham *et al.*, 2003; Jones *et al.*, 2002). In the context of green products, while the latter does not always apply, the former could play a role in deterring green consumption behavior through locked-in behavior. This remark is confirmed with the results of past research, where conventional brand loyalty has been identified as one of the main barriers to purchasing green products (Gleim, M. R. *et al.*, 2013).

### 4.4.2 Purchase costs

The perception of the green product is stigmatized; even when the green product is on sale, consumers turn away as they believe it would always be more expensive (Aschemann-Witzel et Niebuhr Aagaard, 2014a)[4]. These misperceptions accompany the green product whenever people intend to buy it, and they constitute the second part of perceived green costs : repeated purchase costs, encompassing monetary costs.

[4] The observation of participant #7 in Jessica Aschemann-Witzel et Emilie Marie Niebuhr Aagaard, «Elaborating on the attitude–behaviour gap regarding organic products: young D anish consumers and in-store food choice», *International Journal of Consumer Studies* 38, no. 5 (2014a).'s study.

#### 4.4.2.1 Monetary costs

In the context of the green purchase, the price has been frequently reported as the most significant barrier that prevents consumers from purchasing a green product (Buder *et al.*, 2014a; Davari, Arezoo et Strutton, David, 2014; Liobikienė et Bernatonienė, 2017; Weisstein *et al.*, 2014). Empirically, Gleim, M. et J. Lawson (2014) found that price is among the main reasons for the green attitude-intention gap. Similarly, Buder *et al.* (2014a) showed that price was repeatedly stated among the three top reasons to buy the conventional instead of the green option regardless of the type of green product. Comparable results regarding the negative impact of green price on the attitude as well as the intention to buy green products were recently reported by Fan *et al.* (2019); Mkhize et Ellis (2020), and Pham *et al.* (2019). Thus, price "puts off consumers" in their eco-friendly journey (Papista et Krystallis, 2013).

## 4.5 Scale development

Aiming at developing a valid and reliable measurement scale of perceived green costs, we follow the scale development paradigm outlined by Churchill Jr (1979). After having presented the conceptual delineation above, we conduct a qualitative study to generate initial items. Items are then purified based on experts' examination. A scale refinement through quantitative data analysis follows, and finally, scale validation, predictive and nomological validity are established.

### 4.5.1 Phase 1: Qualitative Study and Item Generation (Study 1, n= 13)

We conduct a qualitative pilot study to confirm the existence of the costs reviewed in the literature and to explore further costs in the specific context of green cosmetics and personal care products.

#### 4.5.1.1 Procedure

This pilot study consists of semi-directed interviews of approximately 24 minutes each, guided by an interview guide. Participants are all female residents of [City Removed]. The interviews took place in a university laboratory – a sustainable mock shop. However, three interviews took place remotely (via zoom and messenger). At the end of the interviews, participants were rewarded with an eco-friendly personal care product that they picked themselves from various choices (Soaps, shampoos, sunscreen, lip balm, deodorant, insect repellent…etc).

#### 4.5.1.2 Participants

Participants constituted a convenience sample of 13 female consumers between 23 and 44 years old and who demonstrated their interest in the subject of the study.

#### 4.5.1.3 Data analysis and results

The interviews were audio-recorded, transcribed, and coded on the software NVivo. The principal researcher analyzed the data following thematic data analysis. Results confirmed the existence of the seven types of costs found in the literature on

green perceived costs. Notably, we found two additional types of costs: sensory appeal loss costs and variety loss costs.

#### 4.5.1.3.1 Sensory appeal loss costs

Participants mentioned their dislike of the packaging colors and the inferior quality of perfume of specific green cosmetics. These aspects concern sensory appeal loss when switching to green alternatives. These costs relate to the sensory attributes of the conventional products, which are hard to find in eco-friendly products, such as the visual appeal, the olfactory appeal, and the tactile appeal.

#### 4.5.1.3.2 Variety loss costs

Purchasing a cosmetic or personal care product is associated with a hedonic dimension of choice. Consumers expect a wide range of brands and compositions for different skin types. When turning to the green alternative, the choice is limited. This cost has been evoked by Gleim, M. R. *et al.* (2013) in their qualitative study on the barriers to green consumption. Hence, we define variety loss costs as 'the sacrifices associated with the loss of variety and options to choose from, whether intra-brand (line of products) or inter-brand (competitors)'.

### 4.5.1.4 Item generation

Our conceptual review and qualitative pilot study facilitated the generation of 73 items aimed at measuring perceived green costs.

### 4.5.2 Phase 2: Item Purification (Study 2, n=5)

We sent the generated items and the domain definitions to five marketing professors. This phase aims to assess each item's face validity and delete or modify items that seem problematic. The rule followed is that items will be removed, modified, or replaced if at least one expert recommends so.

Based on the feedback provided, 32 items were deleted, leaving us with 41 items. The research group reviewed the remaining items in the light of the available literature, and several items were consequently reworded, rephrased, and modified for the next phase.

### 4.5.3 Phase 3: Scale Refinement (Study 3, n=155)

In theory, items generated to measure a specific construct should relate to the core of this construct. When a construct is multidimensional, each dimension correlates with a specific set of items. In practice, only a sample of the generated items follows the expectations and shows acceptable reliability (Churchill Jr, 1979). For this reason, we conduct a quantitative data collection to assess the extent to which the items correlate with higher-order dimensions and construct core. To do that, we first assess the alpha Cronbach of the measurement tool, and then we conduct a factor analysis to assess the loading of each item to the corresponding dimension. This phase aims to delete the items that do not correlate highly on any dimension and those that correlate highly on several dimensions simultaneously.

#### 4.5.3.1 Procedure

After obtaining permission from the FB group admins and universities' ethical boards, an online survey was administered to university students through student Facebook groups. Participants accessed the survey online and responded to each item on a five-point Likert scale. They then chose whether to provide their email at the end of the survey to enter a draw to win one of two 50$ gift cards.

#### 4.5.3.2 Participants

The data collection yielded 254 responses, of which 155 were useable (a rate of 60%). The final sample consisted of 155 participants: 77.41% female and 69.67% between 18 and 28.

#### 4.5.3.3 Data analysis

##### 4.5.3.3.1 Exploratory factor analysis

To have an overall assessment of our items, and to allow for the complementary of both theory and data in constructing our measurement tool (Gerbing et Hamilton, 1996), we first conduct an exploratory factor analysis (EFA) with Promax rotation, allowing but not forcing our factors to correlate. Items were retained if 1) they loaded 0.4 or higher on one factor, 2) they did not present an alternative loading of 0.3 or higher, 3) and the difference between the principal loading and the alternative loading is 0.2 or above (Howard, 2016). The Kaiser–Meyer–Olkin (KMO) value of 0.843, as well as the significant value of Bartlett's test of sphericity ($X^2$= 3621.982, p<0.001), indicate that the sample was appropriate for an

EFA. In total, ten factors presented an eigenvalue that is above 1. Three of those factors presented a single item factor and were consequently disregarded, especially when this single item did not correlate with the items supposedly measuring the same construct. As expected, some items measuring constructs in the same category of costs (example: learning and evaluation costs) loaded on the same factor. Also, items measuring costs of lost performance and uncertainty costs loaded on the same factor. Items measuring learning costs loaded on two different factors. These results will be explored further in the confirmatory factor analysis for validation. Overall, 11 items were deleted, and 31 remained for further analysis.

4.5.3.3.2 Confirmatory factor analysis, model modification and comparison

A seven-factor CFA (Model 1) was estimated by maximum likelihood (ML) using lavaan package (Rosseel, 2012) in R & Rstudio (RStudioTeam, 2020). This model presented poor fit with CFI=0.881, TLI=0.66, rmsea=0.068 and $X^2$/df=1.717. The model was purely empirical and concluded from the results of the EFA.

In the light of theory, we modified the CFA structure and produced several models to better the model's fit. First, we deleted the items that were supposed to load on one construct but loaded on another one instead as well as factors with loadings <0.6. We further separated the items that loaded on a single factor in the EFA when in theory, they are supposed to load on two separate constructs (items related to Uncertainty costs and Lost performance costs which correlated on a single construct, as well as items related to Learning costs and Evaluation costs). Learning costs' items

correlated in Model 1 on two separate constructs, so we gathered them in a single construct. Our model (Model 2) improved from the first model, but the fit indexes were still unacceptable. We noticed that learning costs presented two pairs of convergent items, which mirrored two separate constructs. Indeed, each pair of items represented a distinct learning cost: learning about the place of sale and learning about the available offers. We then separated the two constructs again in an SEM model, and we regrouped them in a second-order factor such as Learning costs= Learning offers + Learning place. The resulting model (Model 3) offered significantly enhanced results, with CFI=0.955, TLI=0.942, rmsea=0.054, and srmr=0.055, mirroring a good model fit. A final CFA model, which splits the learning costs in two but does not include second-order learning costs, was also computed (Model 4) and presented slightly improved fit indexes compared to the previous model (Model 3). The results discussed above are featured in Table 2.

4.5.3.3.3 Reliability, Convergent and Discriminant validity

Internal reliability is confirmed with Cronbach's alpha > 0.6 for all the constructs. Similarly, the values of Mcdonald's omega mirror the values of alpha, which validates the composite reliability of the items retained.

Factor loadings are all above 0.6, or very adjacent to it (lowest loading = 0.597), and the average variance extracted is larger than 0.5 for each construct/dimension, but one (Sensory appeal). This means that factors are

unidimensional, and it further confirms convergent validity. As for the Sensory appeal construct, we keep it for further investigation in the next data collection.

Discriminant validity is also satisfied as all inter-construct covariance are lower than the root square of the average variance extracted (AVE) for each construct (Table 3). The final model, which consists of 9 factors and 22 items, is presented in Appendix 1 along with its psychometric properties.

### 4.5.4 Phase 4: Scale Validity (Study 4, n= 104)

We replicate the CFA, validity, and reliability analysis of phase 3 on a fresh data set. Our purpose in this section is to confirm the robustness of our scale.

#### 4.5.4.1 Procedure

We designed a new survey integrating the 22 items remaining after the analysis, and we added items measuring the five variables of the theory of planned behavior (Appendix 2). Items were reworded to mirror costs related to the purchase of hand moisturizers. A filter question at the beginning of the survey allowed those who have experience in this type of product to continue to the rest of the survey; otherwise, participants were redirected to end the survey. The survey was administered via Amazon MTurk, and only participants who finished the survey were rewarded 1.5 dollars for their participation.

#### 4.5.4.2 Participants

The data collection resulted in 157 returned questionnaires. We made sure participants did not return to take the survey after acknowledging the existence of a filter question through IP address verification. We also included attention questions, and those who failed these questions were removed from the sample. The final sample consists of 104 participants, 45% female and 77.8% between 18 and 39.

#### 4.5.4.3 Data analysis

##### 4.5.4.3.1 Confirmatory factor analysis

A nine-factor CFA (Model 4 from phase 3) was estimated by maximum likelihood (ML) using lavaan package (Rosseel, 2012) in R & Rstudio (RStudioTeam, 2020). The specified model offered significant improvement from the baseline model at $p$ =.007. It also confirmed our previous results and mirrored a good fit with CFI=0.957, TLI=0.943, rmsea=0.052 and $X^2$/df=1.284.

##### 4.5.4.3.2 Reliability, convergent and discriminant validity

Cronbach's alpha was computed for the scale as well as for each separate construct. The scale's alpha of 0.89 is assumed plausible. The alpha of each separate construct passed the cut-off of 0.65, except for one (sensory appeal loss costs). McDonald’s omega values mirror alpha values, which brings further evidence for the internal reliability of the scale. The composite reliability index was computed manually and yielded a value of 0.97, which brings further evidence of the reliability and internal consistency of the scale.

Factor loadings are all above 0.6, or adjacent to it (lowest loading = 0.556), and the average variance extracted is larger than 0.5 for each construct / dimension, but one (Sensory appeal). This means that factors are unidimensional, and it further confirms the convergent validity of the scale.

Discriminant validity is satisfied as all inter-construct covariances are lower than the root square of the AVE of each construct (Table 4). The psychometric properties of the items are reported in Appendix 1.

The *sensory appeal loss costs* construct did not meet alpha's cut-off with an alpha=0.40, omega =0.59 and AVE=0.48. After careful examination of the two items measuring the latent variable, we decided to slightly modify the wording of the items to converge towards a unique dimension in the next data collection.

4.5.4.3.3 Pre-test for nomological validity

To make sense of our construct in a nomological network, we performed a SEM of the two categories of costs (Purchase costs and Switching Costs) within the model of the theory of planned behavior. We presumed the perceived costs would mediate attitude and behavior, as the literature implies their role on green purchase behavior. Also, we wanted to bring quantitative evidence on the role of perceived green costs in the green gap phenomenon. We computed the model using ML as an estimator. The model (Model 5) consisted of the five constructs of the theory of planned behavior and purchase costs and switching costs as a mediator between attitude and behavior.

The model presented poor fit indexes (CFI=0.851, TFI=0.838, rmsea=0.075 and srmr=0.116). We were nevertheless interested in the viability of the regressions within the sem model. Two regressions were not significant: perceived behavioral control did not influence attitude, and attitude did not influence purchase costs. These results, while unanticipated, are taken into consideration in the following analysis.

We computed another model (Model 6), which abandons the insignificant regressions. The fit indexes did not improve significantly. Considering the small sample size, we decided to compute the model with an estimator other than ML. Model 7 consisted of Unweighted least squares as an estimator. The model fit improved, with CFI=0.963, TFI=0.96 and rmsea=0.079. The srmr of 0.098 is, however high. Nevertheless, the regression coefficients are all significant at a *p-value*<0.005. Despite the poor fit of this model, it offers primary evidence on the nomological validity of the PGCS within the network of the theory of planned behavior.

### 4.5.5 Phase 5: Finalization (Study 5, n=341)

A final larger-scale data collection is undertaken to replicate the reliability and validity analysis of the previous phases.

#### 4.5.5.1 Procedure

The same survey of phase 4 was used in this data collection; however, the sensory appeal scale was slightly modified to converge on a unique dimension (See

Appendix 1). Items were reworded to fit the context of buying eco-friendly deodorants. Participants were recruited via the platform Prolific Academic, and only participants who finished the survey were rewarded 1 euro (the equivalent of 1.5 CAD).

#### 4.5.5.2 Participants

A total of 360 participants were requested via the platform. Only 341 questionnaires were deemed usable after checking attention questions. Therefore, the final sample consisted of 341 participants, 52% female and of average age of 29 years old, all residents of Canada.

#### 4.5.5.3 Data analysis

##### 4.5.5.3.1 CFA, reliability, and validity

We computed the same Model 4 within the new dataset (Model 4’’). The model presented good model fit, with CFI=0.967, TFI=0.956, rmsea =0.046 and srmr=0.043. Within this model, the sensory appeal cost construct was not problematic; hence our modification performed the intended enhancements to the model.

The scale is considered reliable, with a Cronbach alpha of 0.89. Manually computed composite reliability of the scale yielded an index of 0.97. Factor loadings are all above 0.6, and the average variance extracted is larger than 0.5 for all constructs. Also, the square root of AVE of each of the constructs is larger than the correlations between the latent factors of the scale, except for one (Table 5). In fact,

the two separate constructs of learning costs (those concerning the offers and those concerning the place of sale) have a correlation that is higher than the root square of the AVE of Learning Costs (Place). Since we established that these two constructs converge to a second-order higher construct of learning costs (in phase 3), we considered this high correlation reasonable. Thus, the reliability, convergent, and discriminant validity of our PGCS are respectively confirmed.

### 4.5.6 Post-hoc analysis: Nomological validity (N=341) and Predictive Validity (N=126)

Verifying reliability, internal consistency, discriminant and convergent validity are necessary to establish a measurement scale. However, they are not sufficient. A scale should further demonstrate its theoretical credibility, i.e., its operational fit within a theoretical model in the field of green marketing and its empirical relevance to managers and decision-makers. For these reasons, we advance our work to confirm the predictive and nomological validity of the PGCS.

#### 4.5.6.1 Predictive Validity

Procedure

We replicated the seventh's study of Wilson et Bellezza (2021). Of the 341 participants who completed the survey in study 5, we randomly recruited 165 participants and asked them to take a picture of the deodorant they currently use and upload it in the survey. Participants were rewarded 0.3 euros via prolific academic for

their participation. The photo downloaded by each participant is coded in a new binary variable called Green Behavior, based on the claims appearing on the product.

## Participants

128 surveys were returned, and 126 were deemed usable for further analysis. The sample consisted of 61% female, with average age=29.86, all residents of Canada. Participants' data was matched with their previous responses on the PGCS from study 5 following their identification code on prolific. Overall, 91 participants in our sample use conventional non-green deodorants, while 35 use deodorants with green attributes (green certification, green ingredients, non-toxic ingredients…).

## Data analysis

A logistic regression (Model ML1) is computed in RStudio, with Green Behavior being the dependent variable and both switching costs and purchase costs being the independent variables. The results show that the switching costs index is a significant predictor of Green Behavior ($\beta$= -1.2, $p$-value<0.0005). However, the effect of purchase costs (monetary costs) on the model was not significant ($\beta$= -027, $p$-value<0.39).

We then computed another logistic regression model (Model ML2) to compare the switching costs index's predictive power with that of intention. In this Model ML2, intention served as an independent variable, while Green behavior was the dependent variable. Results show that intention is a significant predictor of Green

Behavior, with $\beta$= 0.83, $p$-value<0.0001. Examining the two models shows that both constructs (SC and intention) are significant and comparable predictors of Green Behavior and that SC has a larger effect size than intention. Though the PGCS does not surmount intention in its statistical significance, it nevertheless represents a powerful tool to predict green behavior. This brings evidence to the predictive validity of our scale in empirical settings.

Importantly, the scale proves useful beyond its theoretical and statistical power. The PGCS captures important marketing metrics and informs strategy through its forecasting power for actual green purchasing behavior.

#### 4.5.6.2 Nomological validity

To establish the theoretical relevance of the PGCS, the following nomological validity analysis was conducted. We analyzed the data of study 5 (N=341) through structural equation modeling. Model 6 of the previous study was applied to the new dataset (Model 6'). Model 6' displayed acceptable model fit indexes with CFI=0.9 and TFI=0.891. Rmsea=0.061 was also acceptable, but the srmr=0.086 was too high. The model confirmed the existing relationships between the second-order construct (switching costs), the monetary costs (purchase costs), and the rest of the variables of the TPB.

We modified the estimator (replacing ML with ULS) as ordinal data allows this iteration. Model 7' showed significant improvement in the fit indexes, and the regression coefficients remained significant.

Attitude significantly and negatively correlates with the second-order construct of switching costs (β= -0.576, p-value<0.001). This means that when consumers have higher attitudes towards eco-friendly alternatives, they perceive lower switching costs. Moreover, lower perceived switching costs are associated with higher purchase behavior as the relationship between the two constructs is negative (β= -0.323, p-value<0.001). Furthermore, purchase costs represented by the green purchase's repeated monetary costs negatively influence behavior (β= -0.310, p-value<0.001). The results are presented in Table 6, and the nomological network is displayed in Figure 1.

Essentially, the switching costs moderates the relationship between attitude and behavior. And the monetary costs exert a significant negative effect on green purchase behavior. This means that the scale developed and validated within this work quantifies a significant underlying cause for the green attitude-behavior gap. The scale is thus nomologically validated within the literature of green consumption, specifically within the theory of planned behavior, and brings insights on costs as underlying mechanisms to the green gap phenomenon. We discuss the theoretical and practical implications of our work in what follows.

## 4.6 Discussion

In an ever-changing world, consumers experience uncertainties around every consumption decision. Specifically, consumers aiming to change their lifestyles into

more sustainable ones are replacing not only products but also parts of their identity (Savary et Dhar, 2020). Consequently, companies must simplify consumption decisions, understand trade-offs, and eliminate frictions to attract and maintain their clients. Across six studies, we present an 'auditing tool' to better understand perceived green costs, which allows the identification and the measurement of nine costs in green products purchase. Green costs illustrate behavioral 'sludge', and necessitate constant surveillance to mitigate their negative influence and behavioral burden on individuals' decision-making (Shahab et Lades, 2020; Sunstein, 2020). For the end consumer, the lack of information around the performance attributes of green products, their points of sale, availability, and offers represent a critical behavioral sludge preventing them from making the first purchase (Ottman, J. A. *et al.*, 2008).

Furthermore, green consumption is often considered abstract and intangible for consumers (Reczek *et al.*, 2018), and more substantially, for managers and decision-makers. Breaking down the perceived green costs into distinct blocks facilitates surmounting them and resolves the intangibility issue for decision-makers and the end consumer. Therefore, our contribution meets our responsibilities as researchers and as marketers in offering clear steps to facilitate ethical behavior (White, Habib, *et al.*, 2019).

Recently, Papadas *et al.* (2017) conceptualized green marketing orientation to facilitate and improve companies' integration of green marketing practices on the strategic, tactic and internal levels. By analyzing consumers' sustainable consumption

journey and delineating perceived costs, we facilitate this integration, and we contribute, through the PGCS, to systemic change where the ethical choice can be a valid and palpable option for both managers (on the strategic and tactical level) and consumers.

## 4.7 Implications and Future Research

Our work contributes to the literature on the green attitude-intention-behavior gap as a challenge that we face not only in sustainable consumption contexts but also in other ethical consumption contexts. We establish that perceived costs are critical in weakening green behavior as switching costs and purchase costs significantly and negatively correlate with both self-reported and actual green behavior. We extend the work on the Theory of Planned Behavior in the sustainable consumption context and confirm the significant role that switching costs play as a mediator between attitude and behavior.

More generally, the present work contributes to the literature on green marketing as it tackles switching and purchase costs as procedural barriers to buying eco-friendly products. While green costs are not new to the marketing literature, a comprehensive and holistic approach to congregate the dispersed costs has not been undertaken previously. We build on existing research and bring forward a conceptual framework and measurement scale of costs involved in switching from conventional to green products.

Several managerial implications follow from our work. First, most costs presented in this paper are informational by nature or can be addressed through information abundance; therefore, managers of green brands may want to pay more attention to content, social media, and search engine marketing to address the lack of information and to soothe consumers' worries. This will address the learning and evaluation costs and would play a fundamental role in branding the green products and building trust to alleviate consumers' uncertainties and performance concerns. Future work could explore the force of digital marketing in alleviating the green gap, decreasing perceived green costs, and encouraging consumers to switch from conventional to eco-friendly products.

Our findings confirm previous research on the role of monetary costs in blocking green purchase behavior (Mkhize et Ellis, 2020; Tan *et al.*, 2016). Consumers still perceive eco-friendly alternatives as more expensive than conventional alternatives, even with the democratization of green produces and the availability of different offers and prices. These findings call managers and researchers to investigate pricing strategies of green products and brand positioning relative to their conventional counterparts. It would be interesting to delve deeply into the psychology of price perception in green consumption contexts and understand the relationship between green branding and pricing to better architect green prices.

## 4.8 Conclusion

In the year 2022, managers are thriving to include sustainability into the DNA of their companies, and consumers seem to be the only entity 'out of sync' in this environmental vogue (Stafford et Graul, 2020). To comprehend the reasons behind this peculiarity, we investigate consumers' perceived green costs and present a conceptual framework and measurement scale to assess these costs quantitively within the context of the green purchase. We bring evidence to the relevance of our work by confirming its predictive power in real consumption context. We also establish the construct’s nomological validity within the theory of planned behavior, and we accentuate the significance of PGS within the phenomenon of the green attitude-behavior gap. We hope that our PGCS would be beneficial for managers, researchers, and policymakers in evaluating and overcoming frictions in consumers greening process, and facilitating market penetration, branding and communication of green alternatives.

## 4.9 Tables

**Table 4.1.** Domain Specification for each type of costs

| Category of costs | Type of costs/dimensions of costs | Domain specification | Status for the current study |
|---|---|---|---|
| Purchase Costs | Monetary loss costs (CM) | The repeated financial costs of the green alternative. | |
| Switching costs | Pre-switching Search (CS) and Evaluation Costs (CE) | The perception of time and mental effort needed to gather, search, evaluate and analyze information about the new product prior to switching. | |
| Switching costs | Learning costs (CL) | The costs incurred to acquire information about the green offers, their prices and point of sale and the variety of brands available | |
| Switching costs | Uncertainty Costs (CU + SK) | The uncertainty costs extend to both the uncertainty of product performance (not being as efficient as it is supposed to be), and the uncertainty about the claims that the green brands are communicating (green skepticism). We adopt this double-dimensional perspective on uncertainty costs in our study. However, we only develop items for the first part, as the second part is already operationalized. | |
| Switching costs | Performance loss costs (CLP) | The perception of potential reduced utility and overall functionality of the product when switching brands. | |
| Switching costs | Brand relationship loss costs (BC) | The affective loss is associated with breaking the bonds of identification that have been formed with the brand or company with which a customer has associated.<br>It includes the loss of image and meaning associated to the sense of identity of the consumers. | |
| Switching costs | Sensory appeal loss costs (PSC) | The costs related to the sensory attributes of the conventional products, and that are hard to find in eco-friendly products, such as the visual appeal, the olfactory appeal, the gustatory appeal and the tactile appeal. | Newly added |
| Switching costs | Variety loss costs (PVC) | The costs associated with the loss of variety and options to choose from, whether it is inter-brand (line) or intra-brand (competitors) | Newly added |

**Table 4.2.** Fit indexes of the models computed in phase 3, 4 and 5.

| | Model | Estimator | chisq | df | chisq/df | p-value | rmsea | srmr | CFI | TLI |
|---|---|---|---|---|---|---|---|---|---|---|
| Study 3 (n=155) | Model 1 | ML | 709.476 | 413 | 1.718 | 0.000 | 0.068 | 0.080 | 0.881 | 0.866 |
| | Model 2 | ML | 350.383 | 181 | 1.935 | 0.000 | 0.078 | 0.059 | 0.905 | 0.879 |
| | Model 3 | ML | 259.736 | 179 | 1.451 | 0.000 | 0.054 | 0.055 | 0.955 | 0.942 |
| | Model 4 | ML | 248.505 | 173 | 1.436 | 0.000 | 0.053 | 0.050 | 0.958 | 0.943 |
| Study 4 (n=104) | Model 4’ | ML | 222.141 | 173 | 1.284 | 0.007 | 0.052 | 0.068 | 0.957 | 0.943 |
| | Model 5 | ML | 1138.790 | 721 | 1.579 | 0.000 | 0.075 | 0.116 | 0.851 | 0.838 |
| | Model 6 | ML | 952.200 | 612 | 1.555 | 0.000 | 0.073 | 0.115 | 0.869 | 0.857 |
| | Model 7 | ULS | 1001.750 | 612 | 1.636 | NA | 0.079 | 0.098 | 0.963 | 0.960 |
| Study 5 (n= 341) | Model 4’’ | ML | 297.032 | 173 | 1.716 | 0.000 | 0.046 | 0.043 | 0.967 | 0.956 |
| | Model 6’ | ML | 1382.136 | 612 | 2.258 | 0.000 | 0.061 | 0.086 | 0.900 | 0.891 |
| | Model 7’ | ULS | 1650.511 | 612 | 2.696 | NA | 0.071 | 0.070 | 0.970 | 0.967 |

**Table 4.3.** Constructs' correlation, root squares of AVE of study 3, n=155.

| | Monetary | Evaluation | LearningOffers | LearningPlace | Performance | Uncertainty | Brand | Variety | Sensory |
|---|---|---|---|---|---|---|---|---|---|
| Monetary | (0,849) | 0,350 | 0,456 | 0,394 | 0,171 | 0,391 | 0,223 | 0,226 | 0,099 |
| Evaluation | | (0,736) | 0,529 | 0,380 | 0,250 | 0,496 | 0,366 | 0,246 | 0,221 |
| LearningOffers | | | (0,863) | 0,622 | 0,183 | 0,479 | 0,392 | 0,205 | 0,299 |
| LearningPlace | | | | (0,886) | 0,111 | 0,285 | 0,327 | 0,348 | 0,261 |
| Performance | | | | | (0,826) | 0,551 | 0,425 | 0,201 | 0,100 |
| Uncertainty | | | | | | (0,771) | 0,671 | 0,255 | 0,203 |
| Brand | | | | | | | (0,903) | 0,405 | 0,236 |
| Variety | | | | | | | | (0,752) | 0,157 |
| Sensory | | | | | | | | | (0,696) |
| The rtsq of AVE are the numbers figuring in parathesis. | | | | | | | | | |

**Table 4.4.** Constructs' correlation, root squares of AVE of study 3, n=104

| | Monetary | Evaluation | LearningOffers | LearningPlace | Performance | Uncertainty | Brand | Variety | Sensory |
|---|---|---|---|---|---|---|---|---|---|
| Monetary | (0,744) | 0,201 | 0,211 | 0,151 | 0,091 | 0,167 | 0,042 | 0,071 | 0,023 |
| Evaluation | | (0,827) | 0,788 | 0,505 | 0,317 | 0,461 | 0,374 | 0,123 | 0,061 |
| LearningOffers | | | (0,905) | 0,644 | 0,372 | 0,400 | 0,449 | 0,150 | 0,074 |
| LearningPlace | | | | (0,825) | 0,218 | 0,285 | 0,276 | 0,064 | 0,036 |
| Performance | | | | | (0,847) | 0,397 | 0,268 | 0,135 | 0,061 |
| Uncertainty | | | | | | (0,789) | 0,347 | 0,232 | 0,088 |
| Brand | | | | | | | (0,719) | 0,144 | 0,046 |
| Variety | | | | | | | | (0,716) | 0,080 |
| Sensory | | | | | | | | | (0,697) |
| The rtsq of AVE are the numbers figuring in parathesis diagonally in the table. | | | | | | | | | |

**Table 4.5.** Constructs' correlation, root sqaures of AVE of study 4, n=341.

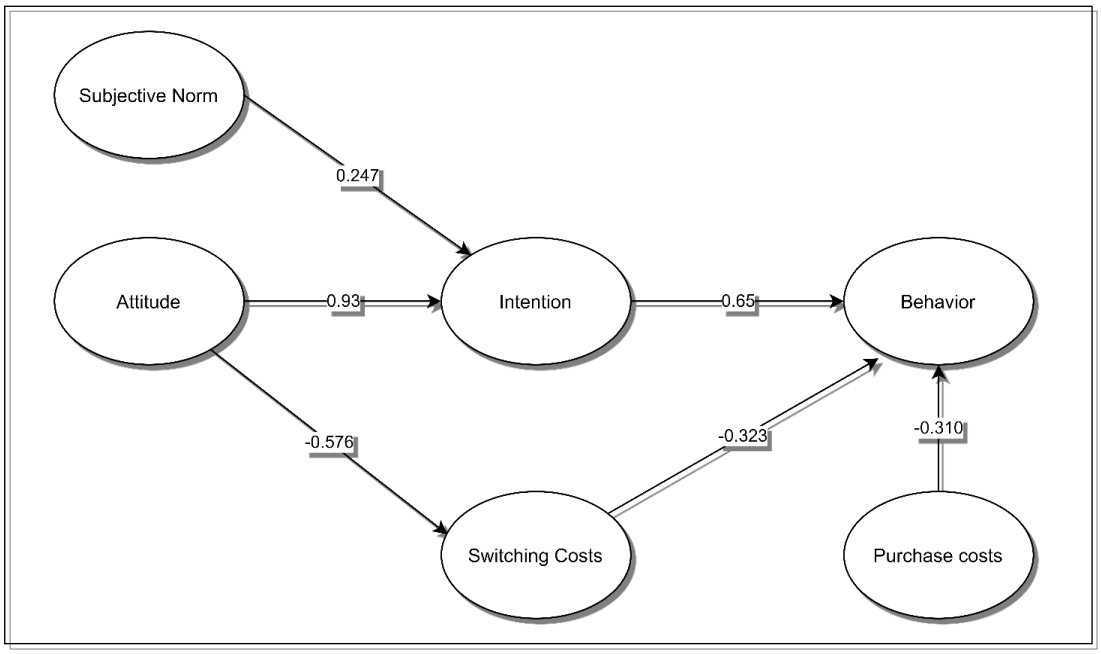
| | Monetary | Evaluation | LearningOffers | LearningPlace | Performance | Uncertainty | Brand | Variety | Sensory |
|---|---|---|---|---|---|---|---|---|---|
| Monetary | (0,762) | 0,117 | 0,077 | 0,109 | 0,124 | 0,124 | 0,137 | 0,163 | 0,065 |
| Evaluation | | (0,800) | 0,444 | 0,484 | 0,234 | 0,328 | 0,374 | 0,248 | 0,298 |
| LearningOffers | | | (0,883) | 0,833 | 0,223 | 0,330 | 0,329 | 0,192 | 0,315 |
| LearningPlace | | | | (0,826) | 0,184 | 0,317 | 0,395 | 0,232 | 0,308 |
| Performance | | | | | (0,877) | 0,476 | 0,379 | 0,250 | 0,316 |
| Uncertainty | | | | | | (0,753) | 0,408 | 0,269 | 0,417 |
| Brand | | | | | | | (0,830) | 0,368 | 0,505 |
| Variety | | | | | | | | (0,690) | 0,307 |
| Sensory | | | | | | | | | (0,770) |
| The rtsq of AVE are the numbers figuring in parathesis diagonally in the table. | | | | | | | | | |

**Table 4.6.** Regression coefficients, standard errors, z-value, p-value and standardized estimates of Model 6'.

| | *Estimate* | *stderror* | *z-value* | *P(>\|z\|)* | *Std estimates* |
|---|---|---|---|---|---|
| ***TPB*** | | | | | |
| *Attitude → Intention* | 0.937 | 0.092 | 10.131 | 0.000 | 0.580 |
| *Subjective Norm → Intention* | 0.247 | 0.056 | 4.428 | 0.000 | 0.220 |
| *Intention → Behavior* | 0.654 | 0.056 | 11.732 | 0.000 | 0.594 |
| ***Perceived Green Costs*** | | | | | |
| *Attitude → Switching costs* | -0.576 | 0.071 | -8.064 | 0.000 | -0.564 |
| *Switching costs → behavior* | -0.323 | 0.089 | -3.610 | 0.000 | -0.185 |
| *Monetary Costs → Behavior* | -0.310 | 0.096 | -3.238 | 0.001 | -0.146 |

## 4.10 Figure

**Figure 4.1.** Nomological network of the perceived green costs scale within the model of the theory of planned behavior (Model 6').



## 4.11 Appendix 1

| | | Study 3 (n=155) | | | | Study 4 (n=104) | | | | Study 5 (n=341) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Items | | Std Loading | **α** | **AVE** | **CR** | Std Loading | **α** | **AVE** | **CR** | Std Loading | **α** | **AVE** | **CR** |
| **Monetary Costs** | | | **0.880** | **0.720** | **0.884** | | **0.787** | **0.553** | **0.970** | | **0.787** | **0.581** | **0.98** |
| **CM1** | Switching to eco-friendly shampoo would involve paying more money than usual | 0.901 | | | | 0.845 | | | | 0.735 | | | |
| **CM2N** | Eco-friendly shampoos have a similar price to the shampoo I currently use | 0.766 | | | | 0.588 | | | | 0.613 | | | |
| **CM4** | I think eco-friendly shampoos are more expensive than the shampoo I currently use | 0.861 | | | | 0.849 | | | | 0.924 | | | |
| **Evaluation Costs** | | | **0.693** | **0.542** | **0.701** | | **0.809** | **0.684** | **0.970** | | **0.760** | **0.640** | **0.970** |
| **CE1** | I cannot afford the time to get the information to fully evaluate if an alternative eco-friendly shampoo suits me | 0.675 | | | | 0.813 | | | | 0.690 | | | |
| **CE2** | Comparing the efficiency of my current shampoo with an alternative eco-friendly shampoo takes too much time and effort | 0.788 | | | | 0.838 | | | | 0.890 | | | |
| **Learning Costs (Learning about the offers)** | | | **0.853** | **0.744** | **0.853** | | **0.893** | **0.819** | **0.980** | | **0.875** | **0.780** | **0.990** |
| **CL1** | It will take me a lot of time and effort to learn about the available options in the market | 0.865 | | | | 0.844 | | | | 0.858 | | | |
| **CL2** | Learning about the features of the eco-friendly shampoo would take a lot of time and effort | 0.859 | | | | 0.958 | | | | 0.907 | | | |
| **Learning Costs (Learning about the point of sale)** | | | **0.879** | **0.785** | **0.879** | | **0.724** | **0.680** | **0.950** | | **0.804** | **0.683** | **0.980** |
| **CL4** | I will have to spend time and effort to learn about the place where eco-friendly shampoos are sold | 0.859 | | | | 0.556 | | | | 0.926 | | | |
| **CL5** | Learning about the points of sale that have eco-friendly shampoos will take a lot of time and effort | 0.913 | | | | 1.021 | | | | 0.728 | | | |
| **Performance Loss Costs** | | | **0.824** | **0.682** | **0.857** | | **0.841** | **0.718** | **0.980** | | **0.886** | **0.770** | **0.990** |
| **CLP1** | The shampoo I currently use gives me effective results I would not receive using another eco-friendly product | 0.597 | | | | 0.597 | | | | 0.682 | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CLP3** | I worry that the new eco-friendly shampoo won't work as well as expected | | 0.885 | | | | 0.926 | | | | 0.935 | | | |
| **CLP4** | I fear that I will be compromising the performance when switching to an eco-friendly shampoo | | 0.878 | | | | 0.909 | | | | 0.946 | | | |
| **Uncertainty Costs** | | | | **0.810** | **0.594** | **0.814** | | **0.831** | **0.623** | **0.980** | | **0.790** | **0.567** | **0.980** |
| **CU1** | I am not sure what is the level of performance that I would have with an eco-friendly shampoo | 0.805 | | | | | 0.760 | | | | 0.728 | | | |
| **CU2** | The efficacy of an eco-friendly shampoo could be worse than the shampoo I currently use | | 0.759 | | | | 0.833 | | | | 0.709 | | | |
| **CU5** | I don't know what I'll end up having to deal with when switching to an eco-friendly shampoo | | 0.747 | | | | 0.775 | | | | 0.807 | | | |
| **Brand Relationship Costs** | | | | **0.891** | **0.816** | **0.898** | | **0.667** | **0.517** | **0.920** | | **0.786** | **0.689** | **0.970** |
| **BC3** | I like the brand of my regular shampoo, and if I am to switch, I have to give up a product of a brand that I like | | 0.941 | | | | 0.775 | | | | 0.962 | | | |
| **BC4** | I care about the brand of my regular shampoo, and if I am to switch, I have to give up a product of a brand that I care about | | 0.857 | | | | 0.649 | | | | 0.675 | | | |
| **Variety Loss Costs** | | | | **0.797** | **0.565** | **0.796** | | **0.748** | **0.512** | **0.960** | | **0.718** | **0.476** | **0.970** |
| **PVC1** | If I switch to eco-friendly shampoos, my brand options will be reduced | | 0.754 | | | | 0.512 | | | | 0.736 | | | |
| **PVC2N** | I think there is a broad range of eco-friendly shampoos on the market, from which I can freely choose | | 0.782 | | | | 0.696 | | | | 0.735 | | | |
| **PVC3N** | When switching to eco-friendly shampoos, I think I will find the same variety for different hair types as that I find in regular shampoos | | 0.719 | | | | 0.900 | | | | 0.574 | | | |
| **Sensory Appeal Loss Costs** | | | | **0.650** | **0.485** | **0.652** | | **0.405** | **0.486** | **0.800** | | **0.739** | **0.593** | **0.970** |
| **PSC3N** | I think it's very likely that the scent of the eco-friendly shampoo will appeal to me *(as much as that of regular deodorant)** | | 0.670 | | | | 0.248 | | | | 0.733 | | | |
| **PSC4** | I believe that the smell of the eco-friendly shampoo will not be as appealing as that of the current shampoo that I use | | 0.719 | | | | 1.036 | | | | 0.802 | | | |

## 4.12 Appendix 2

| Construct | Items | | Reference |
|---|---|---|---|
| **Attitude** | - | Buying a natural moisturizer is an idea that i<br>Dislike -------Like | (Kim, Y. J. *et al.*, 2013; Mostafa, 2007) |
| | - | Buying a natural moisturizer is<br>A bad idea-------A good idea | |
| | - | Buying a natural moisturizer is<br>Unpleasant ----- Pleasant | |
| | - | Buying a natural moisturizer is<br>A stupid idea ----A smart idea | |
| | - | Buying a natural moisturizer is<br>Pointless ----Significant | |
| **Intention** | - | I think I will buy a natural moisturizer soon | Insipred by (Kim, Y. J. *et al.*, 2013) |
| | - | I plan to buy an organic moisturizer | |
| | - | An organic moisturizer is on my list for my next shopping trip | |
| **Behavior** | - | I pay attention that a moisturizer has an environmental label when I buy it | |
| | - | I encourage my family to buy moisturizers that are made from natural ingredients | |
| | - | I buy natural or organic moisturizers | |
| | - | I pay attention if the producer highlights environmental protection when I buy a moisturizer | |
| **Subjective norm** | - | My family and close friends would prefer that I purchase natural moisturizers rather than petroleum-based moisturizers. | (Chin *et al.*, 2018; Kažukauskaitė, 2020) |
| | - | My family and close friends want me to use natural personal care products such as moisturizers | |
| | - | People whose opinion I value recommend that I use natural personal care products, such as moisturizers | |
| **Perceived behavioral control** | - | Whether or not I buy natural personal care products such as natural moisturizers, is completely up to me | (Kim, Yunhi et Han, 2010; Yadav et Pathak, 2017) |
| | - | I am confident that if I want to, I can pay for an environmentally friendly moisturizer instead of a conventional moisturizer | |
| | - | I have the resources, time and opportunities to buy an environmentally friendly moisturizer | |

## 4.13 References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# CHAPTER 5

# TESTING BEHAVIORAL INTERVENTIONS AND TARGETING CONSUMER SEGMENTS

## Article title: Accounting for Consumer and Intervention Heterogeneity to Scale up the Real-World Impact of Behavioral Experiments: the case of Sustainable Consumption

**Chapter information:**

An extended abstract based on this chapter has submitted to Psychology for Consumer Research Conference 2022.

ABSTRACT

To scale up the real-world impact of behavioral experiments, we bring together the strength of behavioral science with data-driven segmentation to elucidate the heterogeneity of samples in behavioral research. We take sustainable consumption as a testbed, and across four studies mirroring conventional sampling techniques, we demonstrate that research samples (student and online panel) are heterogeneous regarding their engagement in sustainable consumption (Study 1 &2) and that the existing sub-groups responses to construal framed messages are substantially different (Study 3 & 4). Specifically, the results reveal that the least environmentally engaged segment (Non-Green) is driving the effect of the intervention by being more responsive to the concrete (vs. abstract) frame. The other two environmentally engaged segments (Dark Green and Light Green) are naturally more responsive than the Non-Green and equally responsive to both frames. This heterogeneity of samples and outcomes is the reason behind inconsistent results in sustainable consumption research and could potentially resolve the replicability and scalability crisis in behavioral sciences.

## 5.1 Introduction

Consumer researchers and others in the broader behavioral economic field have favored the experimental testing of theory-driven interventions, tracing underlying psychological mechanisms and defining boundary conditions set by a few moderators. Robust evidence now shows that we are still far from real-world impact at the scale of behavioral interventions (Soman et Hossain, 2020), particularly in domains tied to complex challenges, like sustainable consumption, where goals pervade the classical

economic-efficiency- convenience target outcomes to embed social, environmental, and health considerations. This applies to consumers, businesses, and policymaking alike.

A case in point is research on framing interventions for promoting sustainable behavior, which has produced inconsistent results. Some academics advocate for the superiority of a more abstract framing as it matches the abstract representation of the environmental cause in the minds of consumers (Chang, H. *et al.*, 2015; White *et al.*, 2011). In contrast, others defend the efficacy of concrete frames to promote behavior activation and compensate for the intangibility aspect of sustainability (Jäger et Weber, 2020; Reczek *et al.*, 2018). Both streams of research present strong empirical evidence to support their theoretical rationale.

The apparent contradiction in results does not necessarily mean that one of the two streams is mistaken. According to Bryan *et al.* (2021), study samples are likely representative of different segments in the population, each responsive to one type of framing/intervention. Furthermore, the situation is evident with publication bias allowing only studies with significant main effects to be published and widely available. Consequently, systematically accounting for samples' heterogeneity would highlight *for whom* each intervention works best and dissipate confusion.

We build upon this rationale and contribute to the heterogeneity revolution in behavioral science (Bryan *et al.*, 2021) as we integrate segmentation, a practice typical of marketing science, into behavioral interventions. We articulate a novel segment-based approach that systematically accounts for the heterogeneity of samples, and we take sustainable consumption intervention as a testbed to set the foundation for this approach.

Across four studies, we show that behavioral research samples (student and online panels) are heterogeneous in their engagement in sustainable behavior (Study 1 & 2), and that they are optimally composed of three consumer segments. These segments differ in their perception of the green purchase and, most importantly in their responsiveness to green framed messages (Study 3 & 4). Specifically, the least engaged consumer segment responds better to concrete desirability framed messages, while the more engaged segments do not show a preference for one of the frames.

This research reconciles the existing tensions in the green framing literature by emphasizing the importance of segments as moderators of consumer response. We thus advance framing literature by contributing to the optimization conditions under which green framing works best. Second, this work offers solutions to the replicability and scalability issues in behavioral research and promises more consistent results by accounting for and integrating heterogeneity at the core of the experimental design of interventions. The proposed protocol is also cost-effective as it does not require infrastructural reforms to behavioral studies (Bryan *et al.*, 2021). Finally, this work extends segmentation literature, usually conducted in a silo, and brings its strength to the behavioral research realm.

The rest of the paper continues as follows. First, we review the literature on heterogeneity in behavioral interventions, green segmentation and construal framing in sustainable behavior promotion. Then we lay out the foundation of our segment-based framework. Further, we apply the framework through four studies, where we explore the heterogeneity of samples in study 1 & 2, then we explore the heterogeneity of outcomes

in study 3 & 4. Finally, we discuss the theoretical and managerial implications of our work.

## 5.2 Heterogeneity in behavioral interventions

Heterogeneity refers to the difference between several aspects of an intervention; in behavioral economics, it usually encompasses heterogeneity of participants, outcomes, and treatments. In this paper, we address the first two and draw implications for the latter. Participants' heterogeneity has been traditionally considered noise that researchers would suppress to extract a clean main effect, a 'true effect' from the intervention (Davidoff, 2009). However, recent evidence shows that this practice might have been mistaken. Indeed, when researchers focus on the main effect in a sample, they truly focus on the 'effect in the group with greatest numerical representation' in that sample (Bryan *et al.*, 2021). This narrow focus and disregard for the diversity of participants have induced severe doubt about the credibility of behavioral science, especially for its potential to inform policy and ameliorate people's lives. As such, when replicating an intervention to a different or larger population, research has reported a replication crisis and a voltage drop in the observed effect sizes (Bryan *et al.*, 2021; Soman et Hossain, 2020).

In sustainable consumption interventions, we notice a similar trend of inconsistent results, and we presume that heterogeneity plays a major role in it. To begin with, several aspects of the interventions differ from one study to another, such as the type of sustainable behavior (energy saving, recycling, buying eco-alternatives), the geographical location, and most importantly, the sample composition. We explore sampling techniques abundant in sustainable consumption experimental research to elaborate on sample

composition. The samples in the bulk of research are from student populations (Han, N. R. *et al.*, 2019; Reczek *et al.*, 2018; Yang, D. *et al.*, 2015), and online platforms panels (Amatulli *et al.*, 2019; Jäger et Weber, 2020; Line *et al.*, 2016; Reczek *et al.*, 2018). These sampling methods have proven representative and robust enough to conduct experiments and create knowledge under controlled conditions. However, a key factor to samples is their need to be homogeneous on the dimension in question, in this case, sustainable consumption. These samples are not. We suggest that those study samples are heterogeneous in their perceptions and engagement in the sustainable consumption behaviors of matter, and this heterogeneity is generating different results that are driven by the responsive group in each sample. The present research brings evidence of the veracity of this proposition and suggests a corrective measure that systematically accounts for participants' diversity through ad-hoc segmentation.

## 5.3 Green segmentation

Market segmentation is a fundamental pillar of strategic marketing, and it has been introduced and defined by Windell Smith (1956) as 'viewing a heterogeneous market … as a number of smaller homogeneous markets in response to differing product preferences …'. The importance of segmentation lies in admitting that no two market segments can be treated equally, nor can we expect them to respond similarly to the same advertising claims (Russel Haley, 1968). Segmentation is the first step in the STP triad, where T stands for targeting and P for positioning, and its primary goal is to inform marketing mix strategies and align the company's objectives with the needs and desires of the target segment (Fig 1). In green markets, the promotion of sustainable products is more challenging than ever, and green segmentation offers a sound ground upon which

marketers can build their mixes. There is abundant literature that tackles sustainable market segmentation, whether it is generalist; discriminates the segments based on general everyday behavior (Ottman, J., 2011), or product/behavior-specific (Chryssohoidis et Krystallis, 2005; Funk *et al.*, 2020). While segmentation is a cornerstone step for any business, it is less so for interventions and research study samples. Statistical research agencies and academic researchers favor the probability random sampling techniques, perceived as more representative of the population (Etikan et Bala, 2017).

In contrast, and in line with strategic segmentation, marketers of business companies rely on non-probability sampling to prompt responses with higher confidence intervals (Etikan et Bala, 2017). A case in point for research on green advertising is the excessive use of student and panel samples. While we do not oppose using student samples per se, we believe that assuming that this sample represents the population means allowing the co-existence of divergent consumer segments. Therefore, we advocate for admitting the heterogeneity of samples when designing experimental research or intervention: namely, when this experiment aims to test the efficacy of a marketing strategy such as green advertising framing.

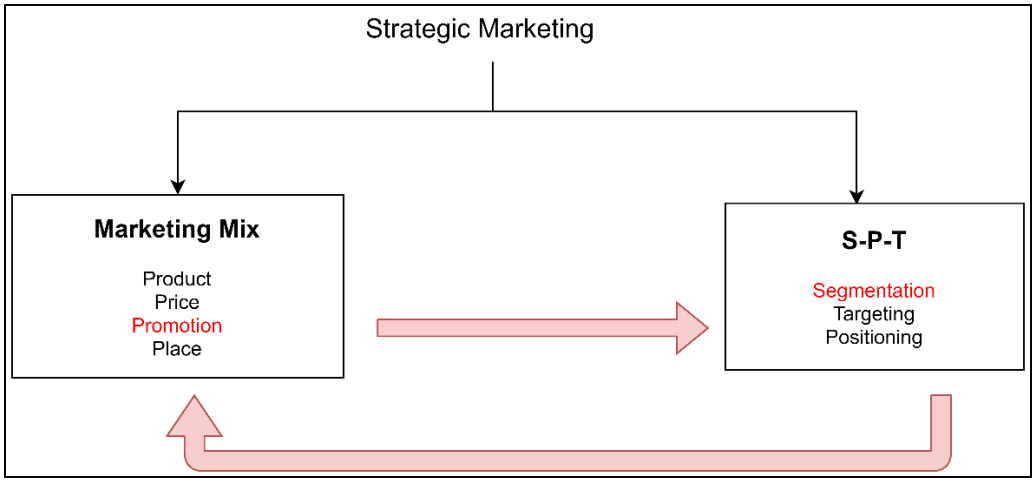


***Figure 5.1.*** *Strategic marketing diagram: the closed information loop between the STP and marketing mix*

## 5.4 Sustainable Behavior Promotion and the Construal Level Theory

The construal level theory posits that objects/messages are represented in individuals' minds on a high or low construal level. The high-level construals are more abstract, psychologically distant, and relate to the desirability of an action and the reasons why an action ought to be done. In contrast, the low-level construals are more concrete, psychologically close, and touch on an action's feasibility and steps towards accomplishing it (Trope *et al.*, 2007).

The construal frame of a message influences the way people react to it (Liberman et Trope, 1998), and different construal frames have been studied in sustainable consumption literature to promote ecological behaviors (Han, N. R. *et al.*, 2019; Segev *et al.*, 2015; Yang, D. *et al.*, 2015), with inconsistent results regarding the more effective frame. Namely, research on this subject parcels in two streams: those in favor of and those opposed to congruency.

As for the first stream, its main argument is that the environment and the environmental benefit are abstract representations in the consumer's mind, and it would be more persuasive to match this representation with a comparable frame (abstract or gain). This matching would, ergo 'activate a similar mode' of information processing, which leads to a positive response to the message (White et al 2011, as cited by Segev *et al.* (2015)). Empirical evidence has supported this view in sustainable consumption, confirming that an abstract (vs. concrete) frame is more effective when matched with environmental benefit (vs. self-benefit) (Yang, D. *et al.*, 2015) and that congruency between loss frame (vs. gain) and low construal (vs. high construal) leads to more positive outcomes in consumers attitudes and purchase intention (Chang, H. *et al.*, 2015). The same for congruency between self-benefit and loss frames (Segev *et al.*, 2015).

Nevertheless, the second stream of research suggests that the abstract representation of the environmental cause is a problem as it causes reluctance in action (i.e., the purchase of the environmentally friendly alternatives), and to counter this problem, researchers suggest matching the environmental appeal with concrete frames to make a balance and encourage concrete behavior (Jäger et Weber, 2020; Reczek *et al.*, 2018). Moreover, empirical evidence suggests that this proposition is plausible as the congruency effect is not always effective: Segev *et al.* (2015) found no significant difference for audience responses between a congruent message (gain + environment) and incongruent message (gain + self-benefit).

Framing is an essential attribute for promoting sustainable behavior, but alone cannot explain consumers' whole response and choices. Erica Mina et al (2010) found that, besides framing, environmental consciousness plays a vital role in explaining

consumers' choices, i.e., different consumers with varying levels of environmental consciousness react differently to green ads. White et al 2019 also state that framing strategies have different effects on different market segments and support this proposition by displaying Kidwell et al's results on the difference between republicans' and democrats' responses to moral vs. individualistic frames. Thus, we consider heterogeneity a determining factor in consumers' response to sustainable products advertising. To the authors' knowledge, the experimental research on sustainable advertising has not yet tested this proposition in understanding consumers' response, specifically to desirability vs. feasibility construal frames.

Given that unfamiliar objects are linked to farther psychological distance, higher construal representations (Trope *et al.*, 2007), and inaction (Liberman et Trope, 1998), we hypothesize that we need to construe the green message with feasibility frames (How) to inspire action/reaction from the less engaged consumers. On the contrary, the more engaged consumers would be more responsive to the desirability framed messages (Why), since they are primed to favor the green alternative for its environmental desirability. In the next section, we present the framework on which we build to test this hypothesis.

## 5.5 Framework: Segment-based approach

The segment-based approach that we bring forward addresses the heterogeneity concern systematically without the need for 'infrastructural reform' of behavioral interventions (Bryan *et al.*, 2021). It is also simple to implement and does not require advanced analytical aptitudes.

It is divided into three parts. First, a segmentation is conducted to the sample population based on relevant variables. The choice of the variables is crucial, as it needs to relate to the phenomenon studied and produce substantial enough variability to discriminate between the segments. Second, a profiling exercise is applied to understand each segment's decision-making mechanisms or behavioral patterns. Third, segmentation variables are embedded in the experimental studies while controlling for any exposure effect these variables can have on the treatment administered.

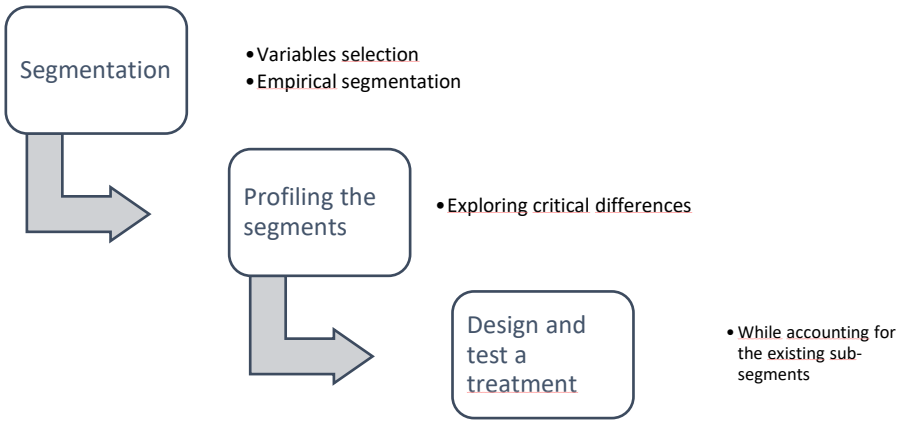


***Figure 5.2.*** *Segment-based experimental approach*

### 5.5.1 Segmentation as a tool to contain heterogeneity

It is fundamental to choose segmentation variables closely related to the behavior addressed by the intervention. In sustainable consumption research, the theory of planned behavior (TPB) has been abundantly employed and proved beneficial in informing decision-makers, consumers, businesses, and governments. Specifically, the attitude, intention, and behavior variables dominate experimental research to assess consumers' responses to behavioral stimuli (for example. Reczek *et al.* (2018) and Han, N. R. *et al.* (2019)). Furthermore, we posit that the existing segments relate to the TPB and the green attitude-intention-behavior gap, as they differ in their perceptions and engagement in

sustainable behaviors. The mix of variables provided by the TPB improves segment validity by increasing the inter-segment variability and the intra-segment similarity as recommended in segmentation literature (Foedermayr et Diamantopoulos, 2008).

### 5.5.2 Profiling segments

To bring an element of reflection (Banerjee et John, 2021) to our approach, we include a profiling step that taps into the discriminating behavioral patterns of the existing segments. In sustainable consumption research, profiling variables should reflect critical criteria for choosing eco-friendly products. Hence, we adopt costs and benefits perceptions as profiling variables. Benefits sought in the eco-friendly alternative are the drivers to sustainable purchase (Barbarossa et De Pelsmacker, 2016), and costs represent a hindering element for accomplishing this behavior (ElHaffar *et al.*, Forthcoming ).

### 5.5.3 Testing treatments between segments and across conditions

Before scaling up interventions, we propose evaluating the responses of the existing segments toward different treatments. This would allow assessing the effect size not only across conditions as is the case in mainstream studies, but also and most importantly between segments, to uncover the segment that is driving the effect, and for whom the intervention works best.

In the present work, we build on the construal level theory in designing the treatments. Specifically, we draw on the desirability vs. feasibility frames in promoting the green alternative.

## 5.6 Empirical work

We recruit student samples and online panel participants to mirror the sampling practices in behavioral research. Our goal is to confirm the heterogeneity hypothesis for the sample (Study 1 and Study 2), and the outcome (Study 3 and Study 4).

## 5.7 Study 1

Student samples are often recruited in behavioral research; hence, Study 1 explores the heterogeneity hypothesis on a conventional student sample.

### 5.7.1 Methods

A student sample was recruited via Facebook student groups of two universities in Montreal. Participants had the choice to provide their email at the end of the survey, to enter a draw to win one of two 50$ gift cards. 254 total responses were received, of which 155 were deemed useable (a rate of 60%). The final sample consisted of 155 participants: 77.41% female and 69.67% between 18 and 28.

Participants were first presented with a small text explaining what an eco-friendly shampoo is. Then they were requested to complete a survey about their thoughts about this kind of shampoo. The survey included measures of attitude, intention, and behavior towards purchasing an eco-friendly shampoo. The items were measured on a 5 items Likert scale (Appendix A). The last section of the survey consisted of general demographics.

### 5.7.2 Results and Discussion

To explore heterogeneity, we first estimate the optimal number of existing clusters within the sample following Malika *et al.* (2014) 's protocol. The results suggest that optimal number of clusters is between 2 and 4. We compute three k-means models (k=2, k=3 and k=4), and then we run ANOVA for variables score between the clusters within each model. The results convey that the two-clusters model has the least goodness of fit Gof index (58%), while the four clusters model presents an insignificant difference between two clusters on attitudes' scores ($p$=0.719). Hence, we continue our analysis with the three-clusters model (GoF=70.6%).

Since the segments are clustered based on their perception and engagement in sustainable behavior, we label them Dark Green, Light Green, and Non-Green, following Wüstenhagen (2000)[5]. And we follow this labeling along the rest of the paper.

We cross-validate our model to verify the stability of the segmentation through Linear Discriminant analysis, and k-fold analysis. We then split the data into training data (n=110), and test data (n=45).

The results yield an accuracy index of 0.954, and Cohen's kappa coefficient of 0.931, confirming the agreement level of the classification is strong in the test data. Applying the prediction model to the held-out test data generated a confusion matrix with similar values; accuracy index 0.955, kappa coefficient=0.932, and strong sensitivity and

[5] As cited by Dorian Litvine et Rolf Wüstenhagen, «Helping" light green" consumers walk the talk: Results of a behavioural intervention survey in the Swiss electricity market», *Ecological Economics* 70, no. 3 (2011).

specificity analysis (sensitivity: C1=1, C2=1, C3=0.88; specificity: C1=1, C2=0.92, C3=1).

The results confirm our initial proposition on the heterogeneity of research samples in sustainable consumption. Specifically, student samples are heterogeneous in their attitudes toward the eco-friendly alternative, their intentions to buy it, and their engagement in sustainable behavior.

## 5.8 Study 2

To confirm that our segments are substantially different, not only based on the segmentation variables (variables of the TPB), but also and more crucially, in their perception of the eco-friendly decision, we conduct the following study. The purpose of Study 2 is two-fold. First, we aim to profile the segments by exploring the different costs and benefits perceptions regarding green purchases. Second, we explore sample heterogeneity through online panel samples: a recruiting technique as abundant in behavioral research as student samples.

### 5.8.1 Methods

We recruit an online sample of participants through Amazon Mturk (n=341), and we collect data regarding the attitude, intention, behavior, and costs and benefits (Appendix 2) perceptions of eco-friendly deodorants.

### 5.8.2 Results and Discussion

We follow the same protocol we adopted in Study 1 to cluster and validate the data. The results of the segmentation analysis mirrored those in Study 1 (GoF

index=69.2%, accuracy index $_{\text{training data, n=240}}$=0.986, Cohen's kappa index $_{\text{training data}}$ =0.981, accuracy index $_{\text{test data, n=101}}$=0.980, Cohen's kappa index $_{\text{test data}}$ =0.970, sensitivity: C1=1, C2=0.968, C3=0.969; specificity: C1=0.968, C2=1, C3=1).

Next, we assign a cluster for each observation, and then we conduct ANOVA test to compare the cluster's means for each variable (9 perceived costs and 8 perceived benefits) between the three segments.

The anova tests were all significant ($p\text{-value} \leq 0.05$), such as the costs perceptions for the Dark Green segment were the lowest, followed by the Light Greens and the Non-Greens (Figure 2). On the contrary, the perceptions of the benefits were the highest for the Dark Greens, followed by the Light greens and then the Non-Greens (Figure 3).

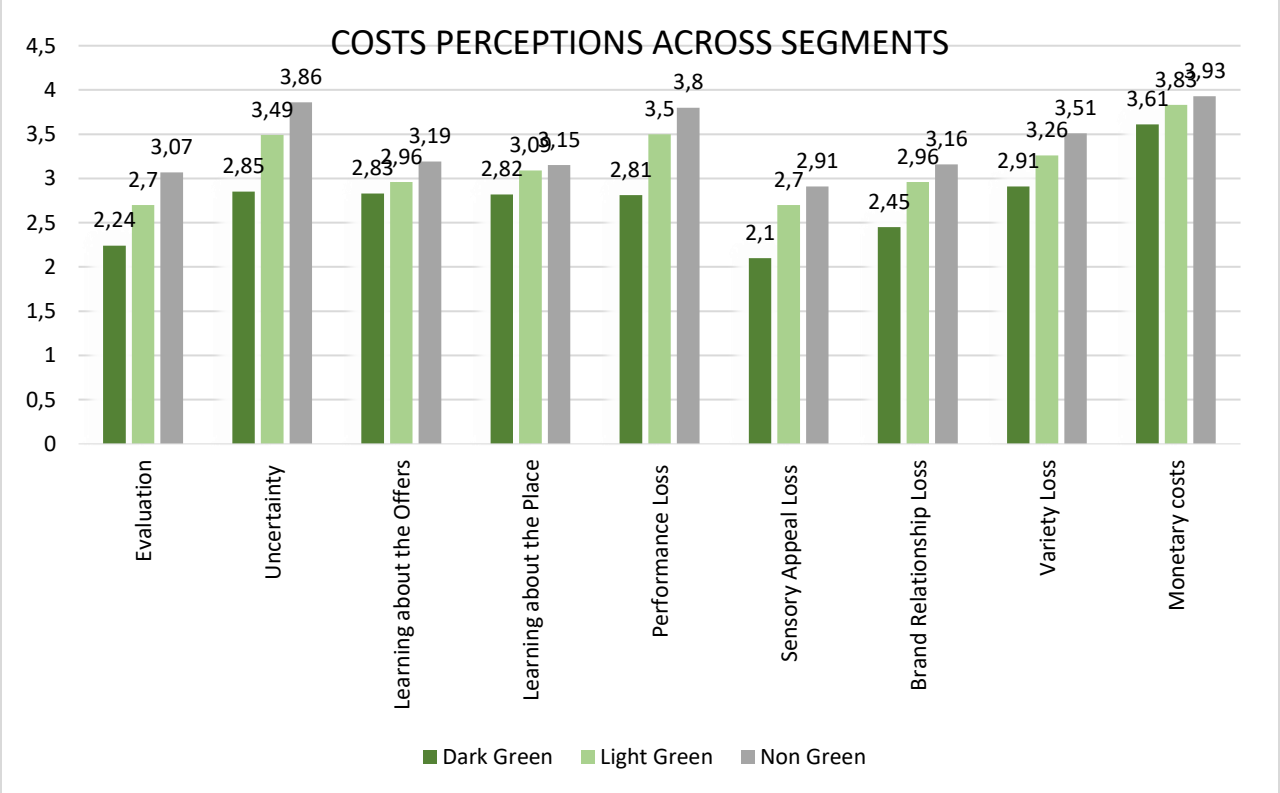


***Figure 5.3.*** *Costs perceptions across segments*

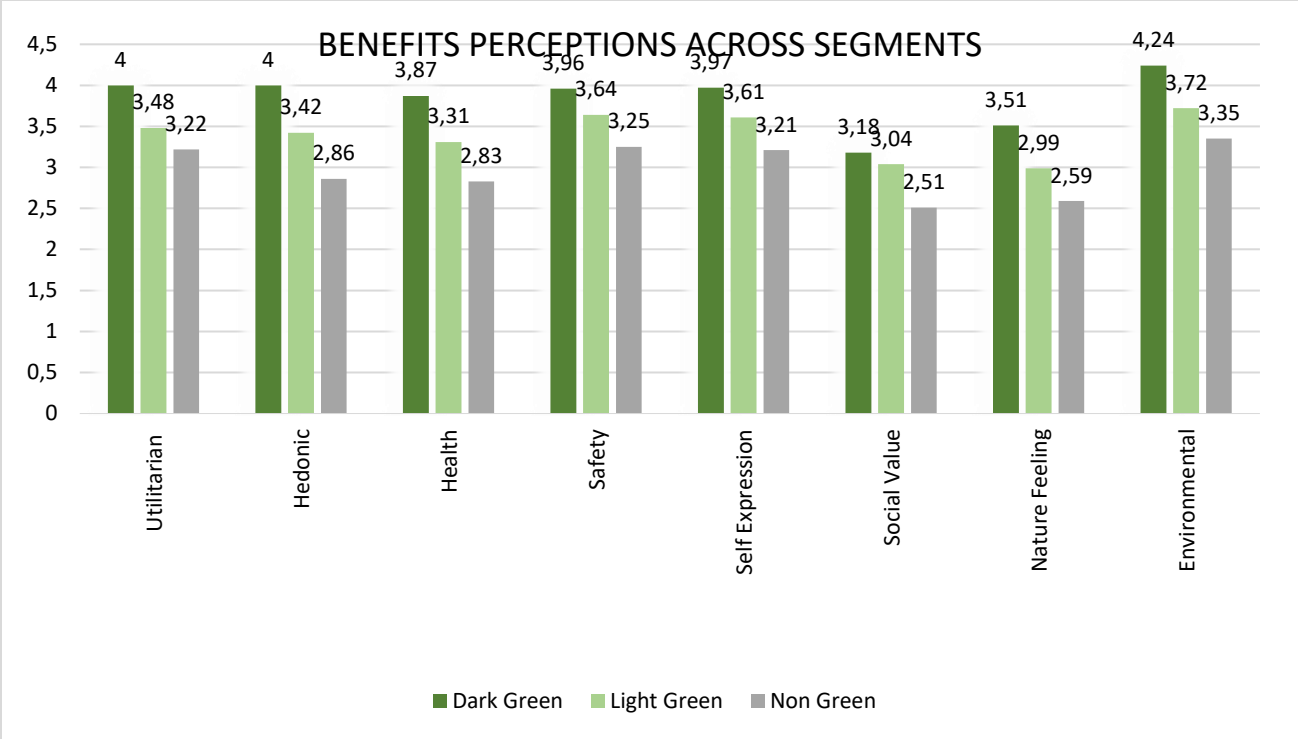


***Figure 5.4.*** *Benefits Perceptions Across Segments*

The results further prove the heterogeneity hypothesis specifically for online panel samples. They further shed light on the perceived value of the eco-friendly purchase. The less engaged consumers (Non Green) perceive important costs and little benefits related to green purchasing, which explains their reluctance to engage in sustainable behavior. As consumers become more sustainably engaged, their costs perception decreases, while their benefit perception increases. This could either be due to the enhanced experience derived from the green product at the consumption rather than at the purchase phase, as reported in recent studies (Tezer et Bodur, 2020). Alternatively, it can be due to their willingness to oversee the costs at the expense of the benefits as sustainability becomes part of their identities (Costa Pinto *et al.*, 2016). Mostly, the latter explanation is plausible since the segmentation variables have been placed prior to the costs and benefits perceptions in the survey, which have made the sustainable identity cues more salient.

## 5.9 Study 3

After confirming the heterogeneity hypothesis for the samples most abundant in behavioral research, we test it for intervention outcomes. This study aims to confirm that sample outcomes differ among consumer segments.

### 5.9.1 Methods

We borrow secondary data (Reczek *et al.*, 2018) where participants have been exposed to either green or conventional advertising. We use the green ad condition for our analysis. The outcome variables are attitude towards the brand, interest in receiving a sample, and intention to buy the product (green household cleaner).

### 5.9.2 Results and Discussion

We adopted the same analysis procedure we employed in Study 1 and 2. Cluster analyses with k=3 explains 54.4% of the variability between the segments. We assign a cluster for each observation, then we test the stability of the segmentation through LDA and k-fold analysis. We divide the data into training data (n=65), and test data (n=27).

The results yield accuracy index of 0.908, and Cohen's kappa coefficient of 0.848, confirming the agreement level of the classification is strong in the test data. Applying the prediction model to the held-out test data generated a confusion matrix of perfect agreement score (=1) for accuracy index, kappa coefficient, and sensitivity and specificity analysis for each cluster. This brings primary evidence on the heterogeneity of outcomes for consumer segments.

## 5.10 Study 4

Study 1 and 2 confirmed that research samples are heterogeneous regarding sustainability-related attitudes, behaviors, and (cost and benefit) perceptions. Further, Study 3 demonstrated that consumers' responses to sustainable behavior promotion are heterogeneous. However, the link between the existing segments and their differing responses has not yet been established. For that, Study 4 is conducted to explore the heterogeneity hypothesis between segments across different advertising frames. Specifically, we explore how the responses of green advertising frames (desirability vs feasibility frames) differ between the dark green, light green and non-green segment.

### 5.10.1 Methods

We design two experimental conditions (Appendix C) mirroring the desirability (Why condition) vs. feasibility (How condition) of the product (refillable shampoo).

Participants were recruited online through Prolific Academic (n=216), and randomly assigned to one of the two conditions. They were exposed to a Facebook post promoting refillable shampoos, and then were asked to answer questions regarding their attitude, intention (to buy and to recommend), and information-seeking behavior towards the product. After completing the task, we ask participants to answer the segmentation variables (attitude, intention, behavior towards green products in personal care products).

### 5.10.2 Results and Discussion

Manipulation checks: To verify that the experimental conditions conveyed the intended frame, we recruit 31 participants through an online panel and randomly assign

them to one of the two conditions. We then ask them to indicate, on a 7 points Likert scale ranging from 'Not at all' to 'Totally', their level of agreement or disagreement regarding two items measuring the perceived desirability (This Facebook post focuses on how people would use a refilling shampoo station) and perceived feasibility of the stimuli (this Facebook post focused on reasons why people would use a refilling shampoo station). The results confirm that the How condition ($M_{How}$ =4.00, $SD_{How}$=1.22) is perceived as focusing on feasibility more than the Why condition ($M_{Why}$=2.85, $SD_{Why}$=1.31, *p-value*<0.005, *t* (31)=2.53, 95% *CI* [0.22, 2.08]). Similarly, the Why condition ($M_{Why}$=4.55, $SD_{Why}$=0.60) was perceived as focusing on the desirability more than the How condition ($M_{How}$ =3.54, $SD_{How}$=1.27, *p-value*<0.005, *t* (31)= -3.09, 95% *CI* [-1.68, -0.34]).

Between segments: The results of ANOVA test show that the variables' scores were significantly different between the segments, such that the Dark Green segment had the highest reported score, followed by the Light Greens and then the Non-Greens. And this trend was consistent for the desirability and feasibility condition, as well as for all the measured outcome variables.

Across conditions: Interestingly, when comparing the How and the Why condition for the whole sample, as in the case of mainstream research, the score difference was not significant. Moreover, the trend was similar for the attitude towards the product, brand, intention to buy and information seeking intention. The intention to recommend variable displayed a marginally significant result favoring the How condition ($M_{How}$ =5.07, $SD_{How}$=1.48) over the Why condition ($M_{Why}$=4.71, $SD_{Why}$=1.51, p-value=0.08, 95% CI [-0.76,0.046].

Between segments across conditions: The outcome variables means were not significantly different between the Why and the How condition for the Dark Greens and the Light Greens. However, for the Non-Green segment, this difference was significant for the attitude towards the products (*p-value*<0.05, *t* (55) =2.23, 95% *CI* [0.08, 1.50]), the intention to recommend the product (*p-value*<0.05, *t* (55) =2.36, 95% *CI* [0.16, 2.00]), and information-seeking behavior (marginally significant at *p-value*=0.08, *t* (55) =1.74, 95% *CI* [-0.11, 1.62]), such that the How condition triggered more favorable results than the Why condition (See Table 1).

This result uncovers that the Non-Green segment is driving the effect in the overall sample, and asserts that the existing consumer segments within a population/sample react differently to advertising frames, confirming therefore the heterogeneity hypothesis across conditions and between segments. Since this segment has typically resisted persuasion attempts, our result may open new pathways to behavioral change at scale.

*Controlling for exposure effect:* the segmentation variables were intentionally placed at the end of the survey to control for exposure effect (priming effect) that could alter the results otherwise, which we suspect have primed the participants' results in Study 2. Precisely, we recruit a sample of 159 participants, and we reverse the order of the survey items, such that the segmentation variables are presented first, followed by the experiment. ANOVA tests revealed no significant differences between the segments across conditions for all the outcome variables (*p-value*>0.1).

TABLE 1: RESULTS OF THE OUTCOME VARIABLES OF STUDY 4

| | Dark Green | | Light Green | | Non-Green | |
|---|---|---|---|---|---|---|
| | Desirability | Feasibility | Desirability | Feasibility | Desirability | Feasibility |
| | Mean \| SD | Mean \| SD | Mean \| SD | Mean \| SD | Mean \| SD | Mean \| SD |
| **Attitude towards the product** | 6.29\| 0.87 | 6.28\| 0.77 | 5.83\| 0.78 | 5.86\| 0.81 | 4.85\| 1.29 | 5.64\| 1.34 |
| **Attitude towards the brand** | 5.99\| 0.89 | 6.04 \| 0.76 | 5.65 \|0.92 | 5.71 \| 1.10 | 4.7 \| 1.41 | 5.19 \| 1.45 |
| **Intention to buy** | 5.48 \|1.26 | 5.03\|0.97 | 4.89 \| 1.13 | 4.15 \| 1.05 | 3.38 \| 1.58 | 3.74 \| 1.25 |
| **Intention to recommend** | 5.48 \| 1.26 | 5.67 \|1.05 | 4.89\| 1.13 | 4.98 \|1.35 | 3.38 \| 1.58 | 4.45 \| 1.79 |
| **Information seeking intention** | 5.53 \| 1.35 | 5.56 \| 1.20 | 5.23\| 1.09 | 4.85\| 1.31 | 2.94 \| 1.62 | 3.70 \| 1.60 |

***Table 5.1.*** *Results of the outcome variables of Study 4*

*Effect size and voltage drop:* A comparison between the effect size of the reactive segment (Non-Green) for whom the intervention works best and the whole sample is conducted to trace the voltage drop as mentioned earlier. The voltage drop phenomenon is illustrated in Table 2, where the intervention prevails an acceptable effect size on a conventional responsive segment (the Non-Green segment), then, when scaled up to a larger population, presents a diluted effect.

TABLE 2: THE VOLTAGE DROP PHENOMENON OBSERVED IN STUDY 4

| | Sample | | Effect size ηp2 | Non-Green | | Effect size ηp2 |
|---|---|---|---|---|---|---|
| | Desirability | Feasibility | | Desirability | Feasibility | |
| | Mean \| SD | Mean \| SD | | Mean \| SD | Mean \| SD | |
| **Attitude towards the product** | 5.74\| 1.09 | 5.94\| 1.01 | **0.0091** | 4.85\| 1.29 | 5.64\| 1.34 | **0.0827** |
| **Attitude towards the brand** | 5.53\| 1.15 | 5.68 \| 1.16 | **0.0040** | 4.7 \| 1.41 | 5.19 \| 1.45 | **0.0291** |
| **Intention to buy** | 4.15 \|1.18 | 4.34\|1.20 | **0.0065** | 3.38 \| 1.58 | 3.74 \| 1.25 | **0.0373** |
| **Intention to recommend** | 4.72 \| 1.51 | 5.07 \|1.48 | **0.0142** | 3.38 \| 1.58 | 4.45 \| 1.79 | **0.0918** |
| **Information seeking intention** | 4.78 \| 1.67 | 4.76 \| 1.54 | **0.0000** | 2.94 \| 1.62 | 3.70 \| 1.60 | **0.0523** |

***Table 5.2.*** *The voltage drop phenomenon as observed in Study 4*

Barriers[6] and Motivations: To tap into the underlying mechanisms of the outcome variables in each condition, we asked participants to rate the different categories of

[6] We use the term barrier and not cost, since we add an item measuring apathy, and according to Ghina ElHaffar, Fabien Durif et Laurette Dubé, «Green but at what cost? A typology and scale development of perceived green costs», *The Academy of Innovation, entrepreneurship, and Knowledge Conference, 2022* (Forthcoming )., there is a conceptual distinction between the two terms.

barriers and motivations on a scale from 1 to 10, 1 being an unimportant factor and 10 being the most important factor (Appendix E). For the participants, social value is the most important motivation for engaging in sustainable behavior, followed by self-expressive benefit, and the environmental benefit was the least influential. This result was consistent for the three segments. As for the barriers, apathy to reducing their use of plastic bottles scored higher, followed by lack of information. Surprisingly, when comparing the segments' scores, the Dark Green (Mean=7.38) and the Light Green (Mean=7.01) segments had a significantly higher score for apathy than the Non Green segment (Mean=5.81). While unexpected, this result indicates that the green segments are driven by social image more than the environment and that extrinsic factors facilitate their behavior. A comparison of subjective norm confirms this proposition, as the subjective norm is significantly higher for the green segments than for the non greens.

## 5.11 General Discussion

We began this paper with a question on participants' heterogeneity in behavioral research samples and its role in the intervention's effect size. By conducting this research, we confirm that samples in sustainable consumption research are heterogeneous in their attitudes, intentions, behaviors and (costs and benefits) perceptions of the sustainable behavior. Specifically conventional student samples (Study 1) and online panel samples (Study 2). Moreover, we assert that the existing segments within a research sample react differently to green interventions and that the effect size is driven by one segment of the population: the less environmentally engaged segment. While the results are surprising, they are coherent with past research advocating that the less engaged consumers (the Non-Greens) perceive the environmental cause as abstract and unrelated to action-taking

(Milfont, 2010; Weber, 2010). It follows that making the green purchase more concrete and tangible through feasibility framed messages would 'water down' the abstract aspect of eco-friendly behaviors and induce action.

On the other hand, the more engaged consumers (the Dark Greens and the Light Greens) are primed to favor the environmental messages regardless of their construal frame. Thus, their response to green messages is naturally higher than the less engaged consumers (Non Greens), but they also do not drive any effect on the overall effect size of the experiment.

## 5.12 Theoretical Implications

The implications of our findings are diverse. First, this research extends the literature on behavioral interventions' design. By integrating the population's heterogeneity in interventions, we advance behavioral research theory and practice, and we contribute to limiting the replicability and scalability crisis (Loschelder *et al.*, 2019; Soman et Hossain, 2020). The design process of interventions is delicate and often requires an element of reflection specific to the context, the time, the end-user, and the target behavior (Banerjee et John, 2021; Soman et Hossain, 2020). Without these 'careful audits' (Soman et Hossain, 2020), the behavioral science field is at risk of losing its credibility in informing policy (Bryan *et al.*, 2021). Our simple yet evidence-driven framework controls for samples' heterogeneity and offers a cost-effective protocol capable of attributing the effect size to its source within the participants' population. Behavioral research can further advance theoretically by coining down the causality relation and the moderating variables related to heterogeneous samples.

Second, this research resolves conflicting results in the sustainability promotion literature, specifically those related to construal framing. Past research has been divided into advocates of the congruent (abstract + environmental) and the incongruent frames (concrete + environmental) (Segev *et al.*, 2015), and our results shed light on participants' engagement in sustainable behavior as a prospect moderator. Namely, the concrete frames work best for the less engaged consumers. However, the responses of the more engaged consumers are naturally higher than the less engaged but do not differ significantly between the concrete and the abstract frames.

Third, our framework brings together the power of strategic marketing into behavioral interventions to drive more effective real-world impact. We extend segmentation literature which is traditionally conducted in a silo, and we advocate for integrating it in experimental research. Past research on segmentations calls for culminating the power of psychographic segmentation, specifically in sustainable consumption research (Funk *et al.*, 2020). Our research acknowledges this call and demonstrates its merit in ameliorating interventions' outcomes. Our research does not touch on personalizing heterogenous treatments for each consumer segment, but we believe this would be a logical extension of the current work; this research is a step towards tailoring sustainable communications.

## 5.13 Managerial Implications

The current research shows that promoting sustainable behavior can be ameliorated by acknowledging and integrating heterogeneity at the core of the intervention design. Precisely, marketers can better predict the audience's response to

marketing strategies by comprehending the profiles and responsiveness of each existing consumer segment. In the case of sustainable products, the environmentally engaged consumers primed to notice green communication would always be the first to interact with the green communication.

Moreover, this work highlights the relevance of 'How to' content on social media, as it triggers a response from the target and the non-target audiences. The feasibility-oriented information is correlated with a low construal and potentially triggers an action in a short time horizon (Liberman et Trope, 1998). ‘How to’ content is thus essential in the sustainable marketing universe and should be adopted more frequently to overcome environmental procrastination.

Furthermore, our research shows that the less environmentally engaged consumers, who might be excluded from the communication strategy, can respond to the right type of framing, namely the feasibility-focused frames. Although they might not be the most attractive segment in the market for green products, non green consumers can help spread awareness, as their intention to seek information and recommend the product to those who might be interested were significantly higher in the feasibility frames messages. In that sense, our work informs awareness campaigns and recommends widening launch campaigns' reach to include the diverse consumer segments.

In addition, this research confirms that marketers can influence the most resistant segment in the market: the non-green consumers, who present the least positive environmental attitudes, intentions, and behaviors. The least engaged segment reacted significantly higher to a concrete construal frame, which opens new opportunities for market expansion, allowing companies to acquire larger market shares by including

different consumer profiles in their target audience, and adapting their communications accordingly. While past research recommends marketers to focus their attention on the segment showing most interest in sustainable alternatives (Ottman, J., 2011) specifically because green consumers would build their choices on their positive environmental attitudes and intentions, our research shows that a non-linear process of choice and decision is also plausible in the case of non-green consumers. Accounting for this diversity of decision making can procure market gains for companies and could potentially accelerate the ecological transition in other domains.

Finally, the practical implications of our work are not limited to sustainable interventions. Our work provides actionable steps and sets the ground for heterogeneous treatments interventions simultaneously targeting different groups of the population (Soman et Hossain, 2020). We encourage decision-makers, companies, and policymakers to carefully reflect on key segmentation variables in each intervention and collect this data by the end of experiments to dissect the sample's composition and rightly attribute the effect to its source. These steps would inform replications, scale-ups, and policies and eventually help behavioral science deliver its promise of changing the world for the better (Bryan *et al.*, 2021). We believe that this work is promising and hope it becomes a cornerstone to a more structured and credible paradigm in behavioral sciences.

## 5.14 Appendix

### 5.14.1 Appendix A: TPB measurement items

| Variable | Reference |
|---|---|
| **Attitude**<br>- Buying a natural moisturizer is an idea that i Dislike -------Like<br>- Buying a natural moisturizer is A bad idea-------A good idea<br>- Buying a natural moisturizer is Unpleasant ----- Pleasant<br>- Buying a natural moisturizer is A stupid idea ----A smart idea<br>- Buying a natural moisturizer is Pointless ----Significant | (Kim, Y. J. *et al.*, 2013; Mostafa, 2007) |
| **Intention**<br>- I think I will buy a natural moisturizer soon<br>- I plan to buy an organic moisturizer<br>- An organic moisturizer is on my list for my next shopping trip<br>- | Insipred by (Kim, Y. J. *et al.*, 2013) |
| **Behavior**<br>- I pay attention that a moisturizer has an environmental label when I buy it<br>- I encourage my family to buy moisturizers that are made from natural ingredients<br>- I buy natural or organic moisturizers<br>- I pay attention if the producer highlights environmental protection when I buy a moisturizer | |
| **Subjective Norm**<br>- My family and close friends would prefer that I purchase natural moisturizers rather than petroleum-based moisturizers.<br>- My family and close friends want me to use natural personal care products such as moisturizers<br>- People whose opinion I value recommend that I use natural personal care products, such as moisturizers | |
| **Perceived Behavioral Control**<br>- Whether or not I buy natural personal care products such as natural moisturizers, is completely up to me<br>- I am confident that if I want to, I can pay for an environmentally friendly moisturizer instead of a conventional moisturizer<br>- I have the resources, time and opportunities to buy an environmentally friendly moisturizer | |

***Table 5.3.*** *TPB measurement items*

### 5.14.2 Appendix B: Benefits and Costs measurement items

| Benefits | Adopted from |
|---|---|

| | |
|---|---|
| **Utilitarian Benefit** | Sweeney & Soutar, 2001 as cited by Papista *et al.* (2018) |
| 1- I believe eco-friendly deodorants would have consistent value | |
| 2- I think eco-friendly deodorants are well made | |
| 3- I think eco-friendly deodorants have an acceptable standard of quality | |
| 4- I believe eco-friendly deodorants perform consistently/well | |
| **Hedonic Benefit** | Ghazali *et al.* (2017) |
| 1- Buying an eco-friendly deodorant would give me pleasure | |
| 2- Buying an eco-friendly deodorant would make me feel like a better person | |
| 3- The use of eco-friendly deodorant can affect my well-being positively | |
| 4- I would feel relaxed using an eco-friendly deodorant | |
| **Health Benefit** | Bauer *et al.* (2013); Ghazali *et al.* (2017) |
| 1- I believe that an eco-friendly deodorant enables me to live healthily. | |
| 2- I am of the view that the use of eco-friendly deodorant has a health-promoting effect. | |
| 3- An Eco-friendly deodorant and a health-conscious lifestyle match well. | |
| 4- The use of an eco-friendly deodorant enhances my health. | |
| **Safety Benefit** | Bauer *et al.* (2013); Ghazali *et al.* (2017) |
| 1- I believe that an eco-friendly deodorant are free of harmful chemical residues. | |
| 2- I believe that an eco-friendly deodorant features high product safety. | |
| 3- I believe that an eco-friendly deodorant is safer than a conventional deodorant. | |
| 4- I am of the opinion that eco-friendly deodorants are not contaminated. | |
| **Self-Expressive Benefit** | Hartmann et Apaolaza-Ibáñez (2012) |
| 1- By choosing an eco-friendly deodorant, I can express my environmental concern | |
| 2- By choosing an eco-friendly deodorant, I can demonstrate to myself and my friends that I care about the environment | |
| 3- By choosing an eco-friendly deodorant, my friends perceive me to be concerned about the environment | |
| **Social Value Benefit** | Sweeney et Soutar (2001) |
| 1- Using an eco-friendly deodorant improves the way I am perceived by other people | |
| 2- Using an eco-friendly deodorant makes a good impression to other people | |
| 3- An eco-friendly deodorant gives those who buy it a particular social approval | |
| **Nature Experience Benefit** | Hartmann et Apaolaza-Ibáñez (2012) |
| 1- An eco-friendly product, such as an eco-friendly deodorant, makes me feel closer to nature | |
| 2- An eco-friendly product, such as an eco-friendly deodorant, makes me think of nature, fields and mountains | |
| 3- An eco-friendly product, such as an eco-friendly deodorant, evokes the sensation of being in nature | |
| **Environmental Benefit** | Sanchez-Fernandez et al, 2009 cited by Papista and Krystallis (2013)) |
| 1- Buying an eco-friendly deodorant has an ethical interest for me, considering that the product has been ecologically produced | |
| 2- The environmental preservation of eco-friendly deodorants is coherent with my ethical values | |
| 3- Purchasing eco-friendly products, such as an eco-friendly deodorant, has an ethical value for me | |

***Table 5.4****. Benefits and Costs measurement items*

**Costs** Adopted from ElHaffar *et al.* (Forthcoming )

**Evaluation Costs**

1- I cannot afford the time to get the information to fully evaluate if an alternative eco-friendly deodorant suits me
2- Comparing the efficiency of my current deodorant with an alternative eco-friendly deodorant takes too much time and effort

**Uncertainty Costs**

1- I am not sure what is the level of performance that I would have with an eco-friendly deodorant
2- The efficacy of an eco-friendly deodorant could be worse than the deodorant I currently use
3- I don't know what I'll end up having to deal with when switching to an eco-friendly deodorant

**Learning about the Offers**

1- It will take me a lot of time and effort to learn about the available options in the market
2- Learning about the features of the eco-friendly deodorant would take a lot of time and effort

**Learning about the Place**

1- I will have to spend time and effort to learn about the place where eco-friendly deodorants are sold
2- Learning about the points of sale that have eco-friendly deodorants will take a lot of time and effort

**Performance Loss Costs**

1- The deodorant I currently use gives me effective results I would not receive using another eco-friendly product
2- I worry that the new eco-friendly deodorant won't work as well as expected
3- I fear that I will be compromising the performance when switching to an eco-friendly deodorant

**Sensory Appeal Loss Costs**

1- I think it's very likely that the scent of the eco-friendly deodorant will appeal to me (as much as that of regular deodorant
2- I believe that the smell of the eco-friendly deodorant will not be as appealing as that of the current deodorant that I use

**Brand Relationship Loss Costs**

1- I like the brand of my regular deodorant, and if I am to switch, I have to give up a product of a brand that I like
2- I care about the brand of my regular deodorant, and if I am to switch, I have to give up a product of a brand that I care about

**Variety Loss Costs**

1- If I switch to eco-friendly deodorants, my brand options will be reduced
2- I think there is a broad range of eco-friendly deodorants on the market, from which I can freely choose
3- When switching to eco-friendly deodorants, I think I will find the same variety for different hair types as that I find in regular deodorants

**Monetary Costs**

1- Switching to eco-friendly deodorant would involve paying more money than usual
2- Eco-friendly deodorants have a similar price to the deodorant I currently use
3- I think eco-friendly deodorants are more expensive than the deodorant I currently use

***Table 5.5.*** *Costs items*

### 5.14.3 Appendix C: Experimental Conditions

How Condition Why Condition

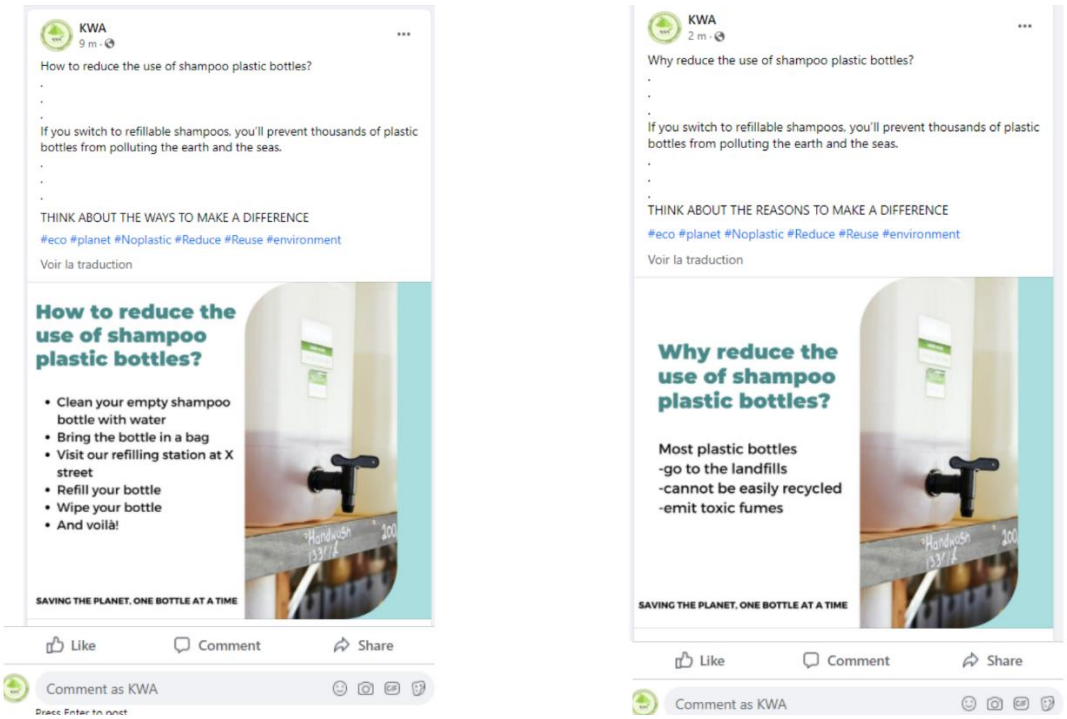


***Figure 5.5.*** *Experimental Conditions*

### 5.14.4 Appendix D: Outcome variables of Study 4

| Variables | Response scale | Adopted from |
|---|---|---|
| **Attitude towards the product**<br>Refilling my shampoo bottle instead of buying a new one is | Bad ---------- Good<br>Unfavorable ----- Favorable<br>Undesirable ------ Desirable<br>Negative ------ Positive<br>I dislike it ------- I like it | Reczek *et al.* (2018) |
| **Attitude towards the brand**<br>Overall, I think that buying my shampoo at KWA refilling stations is | Bad ---------- Good<br>Unfavorable ----- Favorable<br>Undesirable ------ Desirable<br>Negative ------ Positive<br>I dislike it ------- I like it | |
| **Intention to purchase**<br>Given this service is available and accessible for you. How likely is it for you to buy shampoo at KWA refilling stations the next time you need shampoo? | Very Unlikely --- Ver Likely<br>Impossible ----- Very Possible<br>No chance ----- Certain | Mohr and Webb 2005 as cited by Yang, D. *et al.* (2015) |
| **Intention to recommend**<br>How likely is it for you to recommend buying shampoo at KWA refilling stations for a friend/family member or coworker who might be interested? | Very Unlikely --- Ver Likely<br>Impossible ----- Very Possible<br>No chance ----- Certain | |
| **Information seeking intention** | | |
| *How likely are you to try to find out more about this product?* | Certain that I will NOT ------ Certain that I WILL | (Dillard et Ha, 2016) |

| | | |
|---|---|---|
| *I intent to get more information about this product* | Definitely do NOT -------- Definitely DO | (Liu *et al.*, 2005) |
| *I plan de get more information about this product* | Definitely do NOT -------- Definitely DO | (Liu *et al.*, 2005) |

***Table 5.6.*** *Measurement items of Study 4*

### 5.14.5 Appendix E: Barriers and Benefits

***Which of the following is preventing you the most from trying such a refilling station? (Several answers are possible)***

1. Money reasons: it might be expensive
2. Performance issues: it might not be as efficient as my current shampoo
3. Don't know how: I am not familiar with the way these refilling stations work
4. Place: I don't have access to such refiling stations
5. I don't like change: I don't' want to give up my current shampoo
6. Lack of Variety: I am not sure the refilling stations will have a wide variety of shampoos to choose from
7. Perfume: I am not sure if the smell of the shampoo in the refilling stations would be pleasant
8. Lack of time: I don't have enough time to evaluate and get familiar with refilling stations
9. I don't care: I don't really care about reducing my use of plastic bottles

***What would be your biggest motivation to try such a refilling station? (Several answers are possible)***

1. Performance reasons: I think the shampoo would be efficient
2. Enjoyable: I think I would enjoy the experience
3. Environmental reasons: This is better for the environment than the regularly bottled shampoo
4. Impressions on others: Using refilling stations would make a good impression on others
5. Values: Using refilling stations would demonstrate to myself and to my friends that I care about the environment

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# CHAPTER 6 CONCLUSION CHAPTER

This chapter wraps up the current thesis by summarizing its findings, discussing general contributions, making recommendations for respective stakeholders, and discussing limitations and future research opportunities. This research project started with the question 'how to explain and overcome the green attitude-intention-behavior gap?'. A scientific query has been conducted to answer this question and resulted in the production of three articles. The first article explores the state of the art of research on the green gap from the perspective of planned behavior, the domain-specific adaptation of the economic model of consumer choice. The paper offers an overarching framework to understand the inconsistency in consumers' behavior and draws an outline to guide decision-makers in reaching solutions. The second article advances the alternative behavioral economic paradigm by investigating the perceived green costs involved in the green purchase, conceptualizes them, and provides a measurement tool to quantify them. Finally, a third article advance the ‘precision” approach to behavioral research by scrutinizing existing consumer segments' attitudinal and behavioral profiles regarding their sustainable consumption and integrates sample heterogeneity to explore what works for whom in framing interventions. The thesis contributes to both theory and practices, and the following sections discuss the general implications of the thesis in moving forward in the ecological transition.

## 6.1 General discussion

### 6.1.1 The rational-behavioral paradigms of consumer choice

The rational paradigm proposes that individuals' attitudes, intentions, and behaviors should be aligned, and this linearity is illustrated in the theory of planned behavior. A behavioral bias occurs when the linearity is broken, resulting in the attitude-intention-behavior gap. The green gap is part of the behavioral biases studied in behavioral economics literature under the behavioral paradigm. Throughout this thesis, a discussion on the two paradigms has been carried out, specifically in the first and second articles. And the question remains on whether one of the paradigms should be favored in studying and resolving the problem of the green gap.

To illustrate the thesis' position in this regard, consider the perceived green cost scale (article 2), which offers a behavioral alternative to intention in predicting behavior. This work suggests that the PGSC, a construct not derived from a rational model, is a good predictor of behavior. Nevertheless, the intention has produced comparable results within the empirical model. This does not settle the argument but brings a critical reflection. While the example chosen above concerns predicting the green behavior, it does not display the whole picture covering description, explanation, and prediction of phenomena in social sciences. While intentions can predict, to some extent, the green behavior of individuals, they are far from apt to explain and describe how the consumption process is unfolding to produce consistent (a green behavior), or inconsistent behavior (a non-green behavior). In contrast, the data provided by the behavioral variables of costs offer a thorough description and a hint of explanation. It

also provides actionable leads that can inspire marketers to better design the customer journey toward green product acceptance and acquisition.

The present work thus claims the comprehensiveness of the behavioral paradigm, which is also the position of a substantial number of researchers on sustainable consumption. Specifically, in the modeling literature that extends the theory of planned behavior to include non-rational variables such as attribute tradeoffs (Olson, 2013), price framing (Weisstein *et al.*, 2014), consumption context (Griskevicius *et al.*, 2010), self-identity (Champniss *et al.*, 2016) and other psychological variables which improve the explanatory and predictive power of the traditional model of planned behavior of reasoned action. The current thesis claims that adopting a behavioral paradigm covers more descriptive and explanatory details in the overall picture, otherwise overlooked in the rational paradigm.

Whether through a sludge audit (article 2), message framing manipulations (article 3), or heterogeneity analysis (article 3), green consumption can be ameliorated, facilitated, and encouraged by a more fluid choice architecture and an imperceptible nudging stimulus. The current thesis makes a humble contribution to both these streams of research and advocates for converging behavioral science and environmental knowledge in the desired and ongoing ecological transition (van der Linden et Weber, 2021).

### 6.1.2 A pragmatic argument for advancing a precision approach to behavioral economic paradigm

A behavioral paradigm is more comprehensive than a rational paradigm in studying sustainable and unsustainable consumer behavior. However, it is vital to critically examine a third option: a pragmatic solution-oriented precision approach (Dubé *et al.*, 2021) in which the choice of the paradigm is dependent on several aspects of a study, such as the market evolution and the target audience. To illustrate, consider the discrepancy between the weak and the strong sustainability approach. A weak sustainability approach lays the responsibility on the offer side of the market and encourages producers to provide more environmentally efficient products, while the strong sustainability approach calls for a sufficiency mindset that all stakeholders would adopt to change the abundant toxic consumption and production patterns (Bălan, 2020). Nevertheless, how and why would pragmatism favor rationality within this dichotomy?

Acknowledging that the ecological transition is a process that takes time is key. Also, it is crucial to keep in mind that demanding a disruptive change would cause confusion, trouble, and, most importantly, resistance. Individuals, organizations, communities, and governments would respond to ecological pressure with a drive to maintain the status quo (Ram, 1987). For this reason, a strategic start would imply a noiseless, gradual, and seamless progress through nudging consumers to more sustainable consumption choices (a weak approach). This means acting within the capitalist system and the consumption society, replacing unsustainable habits, offering and promoting

green alternatives, and addressing behavioral biases in individuals' decision-making within the market of sustainable alternatives.

Once a substantial number of individuals is on board behaviorally, it is easier and more efficient to move to a *stronger* approach to sustainability that demands deliberate actions from all stakeholders and promises more efficient environmental returns. Starting a compost bin in the backyard, for instance, would become easier to implement if the tools and knowledge were available (a facilitated choice architecture), the neighbors were already doing it (social cues), and the municipality is providing the bin (default option). This is especially the case when the consumer has already adopted other consumption behaviors (using reusable bags, shampoo bars, natural detergents) that align with the new behavior to implement (extension of self-image).

Parallel to that, it is central to recognize that individuals in society are not all at the same place in their ecological journey. While some are still struggling to replace a conventional shampoo with a plastic-free alternative, others live zero waste lives; it is here that the significance of individual differences encounters the pragmatic resolution in sustainable consumption research. The thesis highlights the choice of a research paradigm dependent on the consumer segment subject of the intervention/research/study. Consequently, it would be more effective to adopt a rational paradigm when dealing with green consumers and a behavioral paradigm when dealing with non-green consumers. In addition, the green gappers would gappers have a unique role in informing the behavioral and rational solutions by providing insights on the transition process, challenges, and opportunities. Pragmatism, therefore, informs paradigm choice based on the target population.

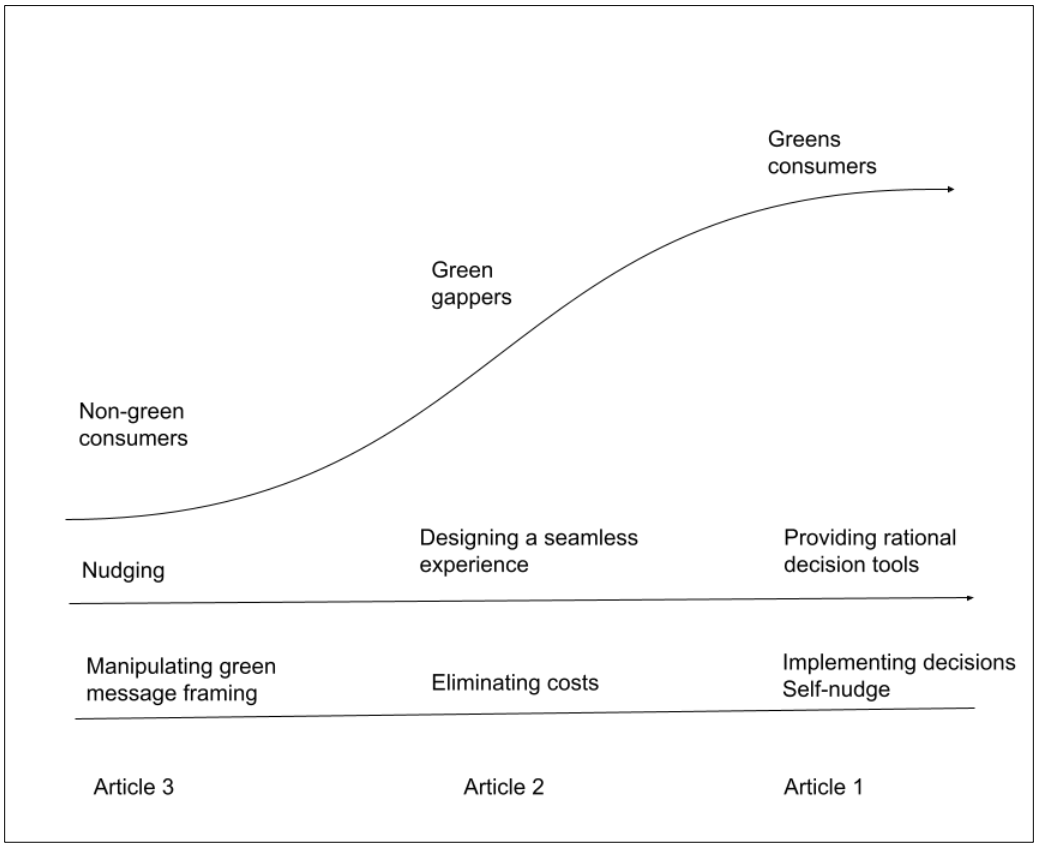


***Figure 6.1.*** *Thesis comprehensive framework*

The empirical results of the current thesis align with the suggested layout, namely, regarding the relevance of the behavioral paradigm for non-green populations. In the third article, a framing intervention is conducted for the three consumer segments, and the only observed effect (mirroring the difference between the two framing interventions) originates from the non-green segment. The other two population segments (green and gappers) responded similarly to concrete and abstract frames and did not contribute to the overall effect size. This suggests that they perceive the communication beyond the framing and deliberately favor the green product, regardless of superficial message manipulation.

As stated above, the three segments are portrayed in an ecological transition journey (Figure 6.1), and consequently, the behavioral interventions (such as framing interventions) would be effective when targeting a non-green population. These interventions become obsolete when the consumers have moved along the journey to join the more engaged consumer segments.

To sum up this discussion on the paradigm relevance, it is apparent that the rational and behavioral approaches are complementary, and the choice of a paradigm should be pragmatic, solution-oriented and dependent on the target consumers' place in the ecological transition (non-green, gappers, and greens), and their weight in the society. Hopefully, these insights will inform decision-makers and environmental activists to accelerate and improve individual and societal ecological transitions.

In what follows, a detailed discussion on the theoretical and managerial implications of the thesis is presented.

## 6.2 Theoretical contributions

### 6.2.1 Green Marketing Literature

The current thesis contributes to green marketing literature as it addresses green market segmentation. Past research has highlighted the significance of segmentation in green brand strategies, but there is a lack of consensus on the optimal segmentation approach (demographic, psychographic, behavioral) to divide and classify the market of green alternatives (Nair, 2015). This thesis adopts a psychographic segmentation and takes it a step forward as it provides an attitudinal and behavioral description of the segments identified in the populations.

The thesis further contributes to green marketing literature by exploring the framing effect in green communications. Research on green framing is divided into advocates of congruency (abstract + environmental) and advocates of incongruency (concrete + environmental) (Segev *et al.*, 2015). This work adds to the conversation and takes a position supporting the incongruency through the results of an experimental study. It recommends framing the environmental message with concrete frames (article 3) and builds on several data points throughout the thesis to explain why this is the case (articles 1 and 2). Particularly, non-green consumers respond better to behavioral interventions (i.e., nudge) than gappers and green consumers since they lack the information, the strong environmental belief, and the intention to engage in eco-friendly activities (article 1). In addition, the non-green consumers perceive higher costs associated with the green purchase, which makes the green choice difficult and unattractive. Hence promoting the green alternative as a psychologically proximate alternative would alleviate the friction and move the non-greens consumers to a favorable spot regarding green alternatives. On the other hand, the greens and the gappers respond similarly to both frames because they perceive the green message beyond the minimal framing manipulations, and hence adopting a concrete frame would be an efficient solution with a larger reach.

Moreover, the thesis contributes to the sustainable consumption literature by addressing the green gap as its main subject. By focusing on the gap, the thesis analyzes unsustainable behavior and dissociates from the mainstream research which tackles sustainable consumption (Prothero *et al.*, 2011). Specifically, the thesis conceptualizes the gap, and adopts a conceptual framework that puts the problem at its core, explores its

root cause, and attempts to resolve it. It further unravels underlying mechanisms contributing to the gap's persistence by delineating the perceived green costs. By scrutinizing the behavioral costs, this thesis pinpoints the green gap as a phase within a sustainable consumer journey that extends beyond the purchase point.

By defining consumers' profile in each phase of their ecological transition- namely non-greens, gappers, and greens- and by outlining the necessary and most effective marketing activities for each consumer profile – precisely, nudging, designing a seamless experience and providing decision tool-, the current thesis maps out a 'green customer journey' that incarnates a central marketing construct (Lemon & Verhoef, 2016) and applies it in a sustainable consumption context. This is virtually, and to the author's knowledge, the first time this concept has ever been raised. The thesis addresses each consumer profile as a separate segment in the market but suggests that these segments are in a dynamic relationship with each other and within their respective sustainability journey.

This thesis also suggests that the gap still exists because of the dominant segment in the market. As more consumers transition from the non-green to the gappers segment, they tend to overestimate their environmental attitudes, beliefs, and behaviors in research surveys, while they still have not made the behavioral leap that corresponds to their intentions. While the existence of the gap might be worrisome for researchers (Gruber, Verena et Schlegelmilch, Bodo B, 2014), the current thesis adopts a more optimistic perspective in its regard. As the transition is comparable to a journey from one phase/segment to another, the existence of the gap gives good ground for expecting a green-dominant society in the near future (Dangelico et Vocalelli, 2017).

### 6.2.2 Behavioral Science

The thesis makes several contributions to the behavioral science discipline. To begin with, it takes as a core subject the green attitude-intention-behavior gap, a phenomenon that has been long studied as a behavioral bias. Consumers do not make consumption choices rationally, especially in sustainable consumption contexts, and the current thesis investigates the irrational behavioral gap that emanates from individuals' ability or inability to act upon their knowledge in such situations (Simon, 2000). The thesis further advances research on the gap by crafting a conceptual framework summarizing the reasons leading to and the solutions to overcome the gap in the context of sustainable consumption. While past research has contributed separately to this research stream, the literature review undertaken in this thesis adopts a novel comprehensive approach to scrutinizing the paradigmatic nature of the gap and the best practices for solution-oriented interventions.

Moreover, this thesis contributes to the literature on sludge which comprises 'frictions that make it harder for people to do what they want to do' (Shahab et Lades, 2020). This construct was born in governmental organizations and the service literature, and the current work extends it to the sustainable consumption universe and claims its mediating role between attitude and behavior, expressly as it refrains the green behavior. Depicting a clear portrait of the behavioral disablers of green consumption throughout the consumption journey pinpoints opportunities for action, specifically to better design the experience. This insight further redeems the individuals from a fair share of the responsibility and attributes it to marketers and business decision-makers.

Finally, the thesis taps on the perceptual and attentional biases that vary between consumer segments, specifically their responsiveness to green advertising. Although the initial goal of the thesis has been to explore and target the gappers, which predictably would need a small push to get on board of the ecological journey, throughout the thesis, this segment has imitated the green segment in its perception and behavior; for this reason, the gappers and the greens have been categorized as 'the engaged consumers' within the last article. The results show that the response of those engaged consumers is naturally higher than that of the non-green consumers, which is probably due to their selective attention: interventions are mobilizing the people who are already concerned about environmental issues but not necessarily convincing the unconcerned individuals (van der Linden et Weber, 2021). However, the current thesis advances the knowledge in this regard by highlighting solutions that trigger the resistant segment. This contribution opens the door to further opportunities to mobilize non-green consumers and ultimately accelerate the ecological transition.

## 6.3 Managerial Implications

### 6.3.1 Implications for consumers

To begin with, the current thesis addresses the green gap as a problem consumers encounter in their eco-transition journey. While they can have strong attitudes and beliefs toward eco-friendly consumption, consumers encounter difficulties when implementing green practices in their daily lives. A primary implication of this thesis for consumers is highlighting the importance of consumer awareness of the concept of the green gap. Consumers might not recognize that they are experiencing inconsistency in their

sustainable consumption behavior, not because they do not care about the environment, but because they – and every human being- experience a bias blind spot (Pronin *et al.*, 2002). Shedding light on the green gap as a behavioral bias that every human being can fall into would humanize the problem, contribute to accepting it and ease the way towards resolving it. Namely, acknowledging the presence of an illness drives action to search for medication, remedies, and treatments. Similarly, when a person recognizes that she is failing to act upon her environmental beliefs, she would get the drive to deal with this failure and undertake the necessary steps to rectify her behavior.

This thesis provides another exciting implication for consumers: the list of behavioral costs that hinder sustainable behavior and cause the green gap. Unraveling the root cause of a behavioral bias helps approach it more consistently and efficiently. While consumers might experience these behavioral costs frequently, they have not given it much thought. Thus, pointing out these costs would facilitate controlling and overcoming them when encountered. For instance, understanding that the green decision takes time and effort to be successfully completed (evaluation and learning costs) would motivate the consumer to keep thriving towards their green goals instead of abandoning it, getting overwhelmed with inaction, and losing faith in themselves.

Finally, this thesis identifies effective self-disciplinary techniques that individuals can adopt to speed up their transition and facilitate the implementation of their good intentions into actions. Although the thesis does not empirically test these techniques, it outlines them in the literature review section. For instance, planning their grocery shopping would help consumers remember to bring their reusable bags. Reflecting with 'it…then' prompts, as an example of implementation intention, would make the green

purchase more tangible and cue individuals to act sustainably when the right occasion arises. Also, self-nudging can be a possible solution to green procrastination and the green gap; for instance, consumers would sign up for local organic baskets and intentionally replace their conventional habits with sustainable ones (Torma, Gabriele *et al.*, 2018).

### 6.3.2 Implications for educators

The insights provided by this thesis represent a rich source of educational material for educators in environmental psychology, marketing, consumer studies, and other social science fields. Teachers in colleges and universities can spread awareness of the existence of the green gap as a behavioral bias and stimulate discussions on the role of individuals in overcoming this bias to contribute to the global ecological transition. It is also useful to have a reference of reasons aggravating the gap, and which is provided in this thesis, so they can mediate the discussions effectively and proactively.

Teachers also play a crucial role in simplifying green consumption practices and providing actionable green steps for students. Specifically, framing the information in concrete low-level construal and illustrating it with examples can water down the abstractness of the environmental issues in the mind of students, who are the future generation, and who will be more equipped to fight environmental problems.

### 6.3.3 Implications for marketers

This thesis brings valuable insights for retailers and marketers to better design their communication strategies and promotion campaigns around eco-friendly products. First, to make the green purchase a viable choice, marketers would eliminate frictions and

sludge that would otherwise impede the green choice. The current thesis contributes to this step by offering a roadmap comprising a list of green purchase costs which negatively influence the green purchase and aggravate the chasm between attitudes and behaviors. By eliminating and minimizing the effects of these costs, marketers have a better chance of reaching the interested consumers. For instance, marketers would eliminate the evaluation, performance, and uncertainty costs by offering free samples in conventional stores for consumers to try. Variety loss and sensory appeal costs would be addressed by widening the range of fragrances of the green cosmetic and by personalizing the uses for different skin or hair types.

Another significant contribution is the revitalization of the segmentation concept and the emphasis on its relevance within the green products market. Although segmentation is a traditional strategic step in each marketing campaign, the current work emphasizes its significance within the green market, as consumers cannot be treated equally in their needs and expectations from the green product. Specifically, consumers who are more environmentally engaged and familiar with green alternatives perceive lower purchase costs, while the less engaged and less familiar consumers need more information and more facilitators to reach their green purchase goals. Putting this heterogeneity into perspective and integrating it at the core of promotional campaigns would increase the efficacy and reach of marketing activities.

In addition, the present work reveals that this heterogeneity goes beyond consumers' perceptions and expectations and impacts consumers' reactions to different communication framing. In other words, the more engaged consumers react positively to green communications regardless of the type of framing used (feasibility vs. desirability).

However, the least engaged consumers react better to feasibility-framed messages, and this segment drives a significant effect size in the whole population. Hence, it is more favorable to use concrete frames when promoting the green purchase to reach all the segments of the population and specifically to trigger the most resistant segment of the market, which has often been ignored or excluded from the target segment of green products.

This work also emphasizes the importance of word of mouth, as non-green consumers, even if they do not intend to buy a green product, are willing to recommend it to someone who might be interested, specifically after seeing feasibility framed advertising. Therefore, green advertising campaigns have more than one goal; trigger purchase intentions for the target consumers, build brand awareness and encourage word of mouth.

Finally, marketers often feel torn between highlighting the green aspect (higher construal) or highlighting other practical aspects of the product when promoting an eco-friendly alternative. This thesis recommends focusing on practical aspects, useability details, and concrete steps that allow the accomplishment of the green behavior. As seen in the experiment in article 3, consumers react more favorably to concretely framed messages. This means that marketers should increase the 'How to' content on social media but also useability information at the point of sale. Influencers can also have a significant role in familiarizing their audience with the brand, the product, and the instruction to buy and use it if it differs from the conventional product.

### 6.3.4 Implications for retailers

In order to boost the sales of eco-friendly products within the retail environment, retailers need to address the availability issue of these products. As the eco-friendly alternatives become trendier and more requested by consumers, eco-friendly cosmetics brands are seen more often in conventional stores such as Pharmaprix (Shoppers' mart) and Jean Coutu. However, the next step would be to offer various brands, fragrances, and uses. These steps would address behavioral costs and create an encouraging context for the consumption of such products.

Another way to inspire eco-friendly consumption is to provide information at the point of sale. This type of nudge answers consumers' needs for information about the products, the brand, the benefits, and instructions for use. As in the case of soap bar shampoos, the consumer might feel intimidated to ask, and this kind of information would boost her purchase intentions into action.

### 6.3.5 Implications for businesses: manufacturing, retailing, and branding

One of the leading green purchase costs is performance loss and uncertainty costs. This perception of environmental products' lower quality needs to be addressed from the production phase and emphasized in the marketing phase. And this issue calls for a strong branding of the eco-friendly alternative as an effective replacement for the conventional product.

The benefits derived from consuming eco-friendly alternatives, which were examined in the last paper of this thesis, offer a rich start for brand positioning. For example, the self-expressiveness benefit can be employed in brand communication and

convey the uniqueness of the product and its users. Similarly, hedonic benefits and the emphasis on the sensory experience and the pleasure in using such eco-friendly products would position green cosmetics in a blue ocean competitive space marrying the conventional hedonic positioning of cosmetics with the product's environmental attributes. In addition, the health and safety benefits can move the brand to a healing-related positioning. These positioning insights must always be aligned with the segment targeted by the brand and must be tested before different consumer segments, as is suggested in this thesis.

### 6.3.6 Implications for governmental agencies and policymakers

This thesis can inspire several implications for governments and policymakers. To begin with, the concept of sludge, which was born in governmental institutions, needs to be addressed in the context of sustainable consumption. Incentives are usually effective in driving sustainable behavior, but they present several behavioral costs for specific product categories. For instance, reusable diapers are encouraged by municipalities in Canada, and citizens who decide to opt for these products get a refund on these products. However, the process is not evident and needs lots of effort from the side of the individual. Institutions could benefit from the insights on green costs presented in this thesis to make the switch to sustainable diapers easier. Free samples of reusable diapers and informative pamphlets for pregnant women can eliminate the behavioral frictions around this kind of green behavior.

Governments have a more extensive and significant reach than local businesses, marketers, and non-governmental agencies and hence can intervene on a larger scale

when promoting sustainable behavior. The insights on integrating population heterogeneity can benefit the large-scale application of green interventions, specifically that these insights can address crucial issues in behavioral interventions such as scalability and replicability. This work can stimulate a new way of doing interventions at a larger scale and promises to correct for the voltage drop observed in scale-ups. By integrating a segmentation section in intervention, policymakers can detect the origin of interventions' effect size and design more targeted interventions.

### 6.3.7 Implications for non-governmental agencies

Non-governmental agencies (such as Green Peace) and social gatherings (such as Zero Waste Facebook groups) promoting sustainable consumption can also benefit from the findings of this thesis. To begin with, this thesis emphasizes that changing attitudes alone and spreading awareness does not guarantee the behavioral outcome. Recognizing the existing behavioral costs and procedural frictions should drive these stakeholders to initiate more collaborations with companies and retailers to eliminate the sludges toward green consumption. This sort of collaboration has the potential to solve the existing frictions as it converges between the consumers and the decision-makers and includes a more global and inclusive perspective.

Another implication of this thesis concerns individuals' lack of self-determination and self-discipline might hinder green consumption. If consumers cannot deliberately make the green choice, there is room for training consumers, specifically those who want to make a change and who want to replace their habits with more sustainable ones. Self-help workshops are very trendy, and designing these workshops to address sustainable

consumption behaviors and habits can add the needed value and provide the push that consumers (the gappers) lack.

Finally, it is vital to keep in mind that consumers are heterogeneous and need different kinds of support for each phase in their transition journey. For instance, in unstructured gatherings such as Facebook groups, admins and page managers must understand this notion and reply to participation accordingly, in a way to not overwhelm beginners and not underestimate advanced green consumers.

## 6.4 Limitations and future research directions

Like any research project, this thesis is not without its limitations. These limitations will be presented and discussed in the following section, and future research directions will be suggested.

First, the thesis is based on self-reported questionnaires as the primary data collection method. While still widespread and credible in marketing research, it can be judged more attitudinal than behavioral and might not reflect the actual behavior of consumers in the consumption context. Also, the experimental part of the thesis is done virtually and not in a real consumption setting. Future research expanding this work and applying the same hypothesis and rationale in retail stores or real health shops through promoted Facebook ads can add more credibility to the findings and inspire applicability.

Second, the samples used in the empirical sections are all student and online panel samples. The choice of these sampling techniques is justified by their abundance in marketing and social science literature. However, it is a stretch to say that they are representative of the whole population, specifically the population that is the target for

green consumption behaviors. Therefore, it is encouraged to employ other sampling techniques such as probabilistic sampling from large pools of participants. It is also interesting to have more purposeful sampling techniques to explore each consumer segment more deeply and qualitatively.

The current work builds on small research samples to imitate the mainstream research on sustainable consumption. Future research is encouraged to replicate and scale up the studies conducted in this volume, specifically to bring more generalizability to its findings.

In addition, throughout the thesis, the goal and focus were on the green gap and the green gappers, and although the thesis makes significant progress towards identifying the existing consumer segments, the gappers still could not be identified a hundred percent in the experimentation section towards the end of this work. This could be due to the changing and unstable nature of this segment or to the elusiveness of consumers in general when it comes to sustainable consumption issues (White, Hardisty, *et al.*, 2019).

By integrating the findings of the current thesis, future work could replicate the exploration of the cost (conducted in the second article) and the corrective experimental protocol (suggested in the third article) in other domains. The thesis explores the universe of personal care products, but other domains in sustainable consumption could benefit from such research, such as food, energy consumption, and financial markets.

The thesis further opens the door for future tailoring opportunities in sustainable consumption interventions. Tailoring has been famous in the health sector (Noar *et al.*, 2007), and personalization is its twin in marketing literature. However, tailoring can be

an interesting next step in research to promote sustainable consumption behavior, specifically as it builds on the heterogeneity insights provided in this thesis.

# Appendix : Autorisation pour la rédaction de la thèse en Anglais.

Québec, le 12 juillet 2021

Sous-comité d'admission et d'évaluation (SCAE)
Doctorat en administration
École des Sciences de la Gestion
Université du Québec à Montréal

**Objet : Demande d'autorisation pour la rédaction de thèse (proposition + thèse) en anglais (règlement 8)**

À l'attention du sous-comité d'admission et d'évaluation (SCAE),

Je vous envoie cette lettre pour solliciter votre autorisation en vue de la rédaction de thèse (proposition et thèse) en langue anglaise en vertu de l'article 8.1.4.5.1 (Langue de rédaction) du règlement numéro 8, qui balise les études aux cycles supérieures.

Candidate au doctorat en administration à l'École des Sciences de la Gestion de l'UQÀM (spécialisation marketing) je prépare présentement ma proposition de thèse.
Je désire la rédiger en anglais, en raison notamment que le français n'est pas ma langue maternelle et que j'ai actuellement plus de facilités de rédaction en langue anglaise. Également, l'audience que je vise pour ma thèse et la poursuite de ma carrière académique est essentiellement internationale, d'où un public anglophone. Je prévois une thèse par articles scientifiques, dans des revues internationales réputées (article 1 : publié dans *Journal of Cleaner Production*; article 2 : soumis à *Journal of the Academy of Marketing Science*). Donc la rédaction en anglais me facilitera beaucoup le processus et me renforcera dans mon parcours académique.

Conformément à l'article 8.1.4.5.1, la thèse comprendra notamment une page titre et un résumé en français.

Veuillez prendre en considération ma demande, et voir ci-joint (page 2) l'approbation de ma direction de recherche.

Dans l'attente de votre réponse positive, je reste à votre entière disposition pour tout renseignement complémentaire.

Ghina ElHaffar
Candidat au doctorat en administration
Département de marketing
École des Sciences de la Gestion
Université du Québec à Montréal

Accord donné par le SCAE
14 juillet 2021

1/2

**Approbation de la direction de recherche**

Fabien Durif
Vice-doyen à la recherche
École des Sciences de la Gestion
Université du Québec à Montréal

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