**Web Appendix A:**

**Examples of Tools for Sustainable Consumer Behavior Change**

|  |  |
| --- | --- |
| **Barrier to Sustainable Behavior Change** | **Tools to Overcome the Barrier** |
| **Social** | * Prime or remind people of relevant descriptive and injunctive social norms * Show others engaging in the desired sustainable behavior * Link the desired sustainable consumer behavior to relevant ingroups * Foster healthy competition between groups to encourage sustainable actions * Highlight that the behavior is observable/increase observability * Make the behavior socially desirable * Encourage consumers to make public and meaningful commitments * Associate the sustainable consumer behavior with an ingroup the consumer identifies with |
| **Habit** | * Utilize discontinuity (life/routine changes) to break bad habits * Use penalties if you can monitor and enforce the program * Use implementation intentions to transition from undesired to desired behaviors * Make the sustainable consumer behavior easy to do * Make the sustainable choice the default option * Use prompts to create positive habits * Use incentives such as gifts or larger monetary incentives to encourage sustainable behaviors * Give individual and comparative feedback |
| **Individual** | * Ensure that the behavior you wish to encourage is positive/ not threatening to the self-concept * Link the behavior, product, or service to the self-concept * Encourage consumers to be consistent with their own values * Encourage individual commitments to behavior change * Appeal to consumer self-interest * Increase self-efficacy * Appeal to those with strong personal norms related to sustainability * Prime or remind people of their personal norms * Take into account individual differences and target those who will be receptive to your message |
| **Feelings and Cognition** | * Consider activating feelings of guilt, but do so in subtle ways * Communicate in ways that activate some negative affect, but that also communicate self-efficacy * Encourage feelings of pride as a result of engaging in sustainable behaviors * Consider providing relevant information to consumers, but do so in combination with other strategies * Utilize eco-labeling and third-party certifications * Communicate in terms of loss framing, particularly in combination with concrete messaging |
| **Tangibility** | * Make consumers more future-focused, to match the future focus of sustainability * Communicate sustainable actions and outcomes in ways that convey proximal and local effects * Communicate the specific steps consumers can take, as well as what the precise outcomes will be * Use tangibility interventions such as vivid imagery, analogies, statistics, to communicate to consumers * Encourage the desire for intangibles |

**Web Appendix B:**

**Steps to Using the SHIFT Framework**

1. ***Step One. Clarify the Context:*** The first step in using this framework involves being very clear in terms of what focal behavior the practitioner wishes to influence. Be very precise when thinking about what your higher-level goals are. Next, think about the characteristics of the context in which the behavior is likely to be enacted. What elements of the context are important in terms of implementing a behavior-change plan?
2. ***Step Two. Identify the Target Segment:*** The second step involves identifying the specific group of individuals that the practitioner wishes to influence. What segment will lead to the most impactful sustainable behavior change? What segment is more likely to be receptive to your intervention strategy?
3. ***Step 3. Determine the Details:*** The third step involves building on what has been uncovered in the previous steps to really understand the motives, preferences, barriers, and benefits of the target market in terms of engaging in the desired sustainable behavior. The practitioner might first look at existing research to answer this question. After this, the practitioner should conduct research on the specific group of interest. Different techniques including qualitative research, surveys, in-depth interviews, and focus groups could be employed here.
4. ***Step 4. Select and Apply the Tools:*** After the first three steps have been completed, the marketer can think about which strategies might be most relevant. A strategy should be carefully selected based on the behavior and the context, the target market, and the barriers and benefits associated with behavior change. We outline one way to do this by considering the primary and secondary barriers, which we provide more detail on in Appendices C, D, and E.
5. ***Step 5. Test Your Strategy:*** In a fifth step the marketer can do a small pilot test of the selected behavior-change strategies. The marketer can use the results of the test to either move ahead with a larger-scale intervention or to go back and think about revising the strategy.
6. ***Step 6. Implement and Evaluate Outcomes:*** The sixth step involves implementing the behavior-change strategy at a larger scale, once a successful strategy has been identified. The practitioner can monitor and measure the outcomes of the intervention and consider using alternative tools if the objectives have not been met.

**\*see also: McKenzie-Mohr 2000, Peattie 1999, Peattie and Peattie 2004, for general steps in the social marketing process.**

**Web Appendix C: Examples of Desired Behaviors as a Function of Primary and Secondary Behavioral Barriers**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Primary Behavioral Barrier** | **Secondary Behavioral Barrier** | | | | |
| **(S)ocial** | **(H)abit** | **(I)ndividual Self** | **(F)eelings and Cognition** | **(T)angibility** |
| **(S)ocial** | **\*** | **Recycling** (driven by social norms and habit) | **Composting** (driven by social norms and inconvenience to the self) | **Decreasing air travel** (driven by spending time with family and positive feeling of the original action) | **Decreasing driving frequency** (driven by social desirability and tangibility of outcomes) |
| **(H)abit** | **Using a reusable coffee cup** (driven by habits and social norms) | **\*** | **Car sharing vs. purchasing** (driven by habit and barriers to self-interest) | **Driving more efficiently** (driven by habit and feelings associated with driving inefficiently) | **Turning down the thermostat** (driven by habit and clarity of outcomes) |
| **(I)ndividual Self** | **Eating less meat** (driven by individual preferences/ and what family and friends do/approve of) | **Purchasing an energy efficient appliance** (driven by perceived cost to self and incentives) | **\*** | **Purchasing an electric car** (driven by perceived costs to self and by feelings of autonomy associated with driving) | **Purchase offsets when traveling** (driven by personal norms to self and perceptions of clear outcomes) |
| **(F)eelings and Cognition** | **Using a reusable shopping bag** (driven by feeling of guilt and social norms) | **Riding bike to work** (driven by negative feelings such as fear and by habit) | **Washing laundry in cold water** (driven by cognitions about effectiveness and benefits to the individual self) | **\*** | **Choosing a green energy provider** (driven by cognitions about attributes and clarity of outcomes) |
| **(T)angibility** | **Purchasing sustainable/used clothing** (driven by clarity of outcomes and what other people will think) | **Purchasing sustainable/fair-trade products** (driven by clarity of outcomes and habit) | **Switching to washable diapers** (driven by clarity of effectiveness and beliefs about self-benefits) | **Purchasing organic food** (driven by clarity of effectiveness and cognitions about health and sustainability) | **\*** |

**Web Appendix D: Examples of Selected Strategies Based on the SHIFT Framework**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Primary Behavioral Barrier** | **Secondary Behavioral Barrier** | | | | |
| **(S)ocial** | **(H)abit** | **(I)ndividual Self** | **(F)eelings and Cognition** | **(T)angibility** |
| **(S)ocial** | **\*** | **S:** Show others engaging in the desired sustainable behavior in public settings + **H:** Give individual or comparative peer feedback on performance | **S:** Communicate about relevant descriptive and injunctive social norms + **I:** Prime individuals to think of the self as part of a collective | **S:** Communicate new ways/norms around spending time with family **+ F:** Show that special moments/positive emotions can occur on “staycations” too | **S:** Communicate new descriptive and injunctive norms around driving automobiles + **T:** Make behaviors and outcomes very tangible and clear |
| **(H)abit** | **H:** Shape positive behaviors using rewards  + **S:** Make the action positive and observable to others | **\*** | **H:** Use discontinuity to break bad habits  + **I:** Bundle incentives with behavior | **H:** Shapepositive behaviors with rewards and feedback  + **F:** Subtly activate feelings of guilt | **H:** Use prompts and feedback to shape habits  + **T:** Make behaviors and outcomes very tangible and clear |
| **(I)ndividual Self** | **I:** Make the action less difficult for the self  + **S:** Create social occasions/communicate positive norms around the behavior | **I:** Increase convenience to the self  **+ H:** Use incentives and prompts to shape the desired behavior | **\*** | **I:** Decrease perceived costs to the self  + **F:** Create positive feelings around the new option/behavior | **I:** Activate personal norm and values + **T:** Communicate clear and tangible outcomes |
| **(F)eelings and Cognition** | **F:** Subtly activate guilt by activating self standards  **S:** Show others engaging in the behavior | **F:** Resolve negative emotions like fear  **H:** Use rewards to shape desired behaviors | **F:** Create cognitions by educating on effectiveness  **I:** Highlight the self-benefits the behavior | **\*** | **F:** Create cognitions via education  **T:** Communicate clear and tangible outcomes |
| **(T)angibility** | **T:** Communicate clear and tangible outcomes  + **S:** Communicate positive social norms | **T:** Communicate clear and tangible outcomes  + **H:** Use rewards to shape positive behaviors | **T:** Communicate tangible benefits (e.g. through third party certifications  + **I:** Highlight ease of use and convenience to the self | **T:** Communicate clear and tangible outcomes  + **F:** Create relevant cognitions about attributes | **\*** |

**Web Appendix E:**

**Examples of Using the SHIFT Framework in Practice**

As we note, identifying primary and secondary barriers is key to utilizing the SHIFT framework. The practitioner should consider their goals, the situations in which the behavior is performed, as well as the social elements in the context, factors linked to habit, characteristics of those who will enact the behavior, feelings and thoughts associated with the behavior, and the degree of certainty and clarity around the behavior. Thinking thoroughly about the behavior in terms of the SHIFT factors can help to understand which barriers need to be overcome and which psychological drivers might best shift people towards sustainable change. One way to do this is to consider the primary and secondary barriers to engaging in the behavior and then selecting relevant tactics to overcome these barriers. A primary barrier refers to a barrier that exerts the strongest avoidance response, while a secondary barrier is the factor that exerts the next strongest avoidance response on the part of the target consumer.

In this section, we provide examples of how to encourage different sustainable consumer behaviors by considering the barriers and benefits to the action. We have done so by focusing on five examples. We have selected these examples by drawing upon what researchers have identified as the being the top five behavior change challenges that will lead to the most positive environmental impacts: *energy conservation, transportation choices, food choices, waste disposal, and material purchases* (see Gifford 2014; Stern 2000). Each of these major behavioral domains encompasses several sub-behaviors that that can be addressed using the behavior change strategies we have outlined in the paper. For example, the broader behavioral domain of energy conservation can involve many different specific sub-behaviors such as space heating, air conditioning, water heating, lighting, etc. (Gardner and Stern 2008). We next select one behavior from each of these five domains and then show how the factors from the SHIFT framework can be mapped on to these different behaviors to facilitate sustainable change.

***Energy Conservation: Washing Clothes in Cold Water (Cognition and Individual Self)***

Multinational companies like Unilever and Procter & Gamble have embraced the difficult challenge of changing consumers' washing behavior (Rowley 2011). Estimates show that around 80% of the energy required to wash a load of laundry is that which is required to simply heat the water. Tide, from Procter & Gamble has set out to create a cold water detergent that works just as well as traditional detergents in hot water, but once they had launched it they realized there were still barriers to changing consumer behavior (Martin and Rosenthal 2011). The primary barrier in this case is *cognition*, as consumers have lay beliefs that hot water is more effective at removing stains and are reluctant to switch to cold water cycles for this reason. This can be tackled by providing information about how the cold water detergents work and that they can be effective in removing stains and washing clothes. However, simply providing this information alone may not work for everyone and secondary barrier is that people see little personal benefit, as cost savings from this behavior change can be negligible. This secondary barrier thus relates to the *individual self*. Appealing to consumer' self-interest by focusing on factors that benefit them will help to tackle this barrier and encourage them to wash clothes with cold water and thus save energy. Tide has begun to do this by showing that washing with cold water saves time, as the water does not need to be heated up, and it also prevents colors from fading and clothes from shrinking. These benefits to the self can further break down barriers to saving energy by washing clothes in cold water.

***Transportation: Riding a Bike to Work (Feelings and Habit)***

Car and truck usage releases approximately 20% of all greenhouse gases in the United States and a shift to cycling can cut greenhouse gas emissions by nearly 11% by 2050 (Mason, Fulton, and McDonald 2015). Encouraging people to cycle, however, is not an easy task and this can be related to the barriers of feelings and habit. One study in Australia identifies *feelings* of fear related to perceptions of safety as one of the main barriers to cycling for both current riders and non-riders (Fishman, Washington, and Haworth 2012). This can be tackled by setting up dedicated bike lanes or making it easier to find safe paths for cyclists with easy to use maps. The secondary barrier for many potential riders is related to *habit*. One way to form a new habit is to think about incentivizing the consumer for different milestones related to the desired sustainable behavior. One possibility is that the consumer can reward the self (e.g., a piece of cheese cake on the weekend) after completing a small, achievable goal (e.g., riding to work three times that week). Or the individual might consider “temptation bundling” where they concurrently combine a pleasant, desired reward with the behavior they feel they ought to engage in (Milkman, Minson, and Volpp 2013). For example, the consumer might save listening to a guilty pleasure (e.g., the Hunger Games audio-book) for their ride to work. A second possibility is that employers could incentivize the sustainable behavior of cycling to work. The company Acato is a digital agency that has developed an app to track the commutes of employees so that employers can track and award employees for cycling to work (Peters 2017).

***Waste Disposal: Switching to Washable Diapers (Tangibility and Individual Self)***

There is a certain level of uncertainty involved in using washable diapers as the sustainability benefits of cloth diapers over disposable diapers are not clear. While disposable diapers use more raw materials and end up in the landfill, washable diapers have been criticized for using energy and detergent in the washing process (“Diaper Decisions” 2017). Because there is conflicting information in the marketplace about what type of diapers is best in terms of sustainability, there is a lot of uncertainty around behavior change and how effective it might be. Thus, tangibility is the main barrier in switching to washable diapers. Moreover, changing to options touted as being more eco-friendly, such as cloth diapers, can be perceived as being very inconvenient to the individual self. Thus, those wanting to encourage a switch from disposable to washable diapers would do well to tackle the first barrier of tangibility by communicating in very concrete and tangible ways about the sustainable benefits of the product. One company that does this is “Gdiapers” (gDiapers 2018), a brand of washable and reusable diapers which claims that they are just as convenient and easy to use as regular disposable diapers. They verify their sustainable attributes by using several third party certifications, such as the Eco Excellence Award, being listed as a B-Corporation, and being certified silver by Cradle-to-Cradle (gDiapers 2018). Providing information regarding third-party certifications and on the specific ways in which the product makes a difference increases clarity and tangibility outcomes. In addition, they combine a disposable insert (which is both compostable and flushable) with a reusable outer pant to ensure parents can continue to have convenience, which appeals to the individual self. In addition, the brand appeals to the individual self, by stating how the product is “true to you” – the consumer can pick the style that suits their needs and individual tastes. In creating this product, gDiapers makes sure that the positive outcomes are tangible while still allowing consumers to choose and use the diapers in ways that reflect positively on the individual self in terms of convenience and individuality.

***Food Choices: Eating Less Meat (Individual Self and Social Influence)***

The Food and Agricultural Organization defines a sustainable diet as those with a low environmental impact, as well as being nutritionally adequate, safe, and healthy (Burlingame and Dernini 2012). The environmental impact of plant-based diets is usually far less than meat-based ones, with eleven times greater energy required to produce animal protein than plant based proteins (Pimentel and Pimentel 2003). Additionally, the production of red meat has been shown to release about 150% more greenhouse gases than either chicken or fish. Because of this, cutting down on the consumption of red meat can tackle emissions more effectively than buying local or organic food (Weber and Matthews 2008). The main barrier to reducing or cutting out meat consumption is related to the *individual self* because consumers do not want to give up something they enjoy eating. In order to encourage consumers to eat less meat, one possibility is that the goal can be phrased as the more attainable goal of *reducing* consumption, rather than the more extreme goal of *ceasing* consumption entirely. One way that has seen some success is the idea of meatless Mondays which allows consumers to explore recipes and alternatives to eating meat such as eggs, cheese, beans or various meat substitutes like tempeh and tofu for one day a week. This can appeal to the consumer’s own individual preferences, while still giving them a sense of self-efficacy in that small actions can add up to make a difference (David Suzuki Foundation 2018). This concept can also help overcome the secondary barrier of *social influence* by creating a day of the week where more people including family, friends and colleagues are engaging in meatless consumption. This makes it easier to make plans for eating outside as well as in the home and can increase the social desirability of the meat free options. Another way to leverage social influence is to show positive referents engaging in the desired behavior. For example, PETA shows notable celebrities in ads (including Paul McCartney, Olivia Munn, Dave Navarro, and Pamela Anderson) who are known vegans (“PETA celebrity ads” 2018).

***Material Purchases: Car Sharing as Opposed to Purchasing a Car (Habit and Individual Self)***

People often buy things they do not need and will hardly ever use. This leads to a large amount of material purchases for items that could more efficiently and sustainably be shared. For example, car sharing is one way of more effectively using resources (Sundararajan 2016). One of the main barriers to car sharing is habit and the secondary barrier is related to the individual self. First, people have developed *habits* that involve taking their own car everywhere they go and they see no reason to change such habits. One way to think about tackling this problem is to consider addressing those who have yet to develop these habits, such as young people who have not bought their first car, people who move from one area to another, or those that live in dense walkable cities. These individuals might be more open to adopting positive habits. Further, car sharing companies that can increase ease of use, making it easy to locate and access a car, will be more likely to be able to foster sustainable habits. Ease of use also relates to the *individual self.* For many people, switching to car sharing is seen largely as a cost to the individual self, so highlighting how car sharing can save money (with a calculator that helps to show the costs of owning versus sharing a vehicle). It is also worth considering highlighting car pooling, along with car sharing because one of the benefits of this is the ability to drive in the High Occupancy Vehicle lane, which offers the benefit of saving time to the consumer.

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**Web Appendix F: Examples of Climate Labels from Our Horizon**

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**Web Appendix G - Master Table**

Table summarizing papers on each of the five principles for sustainable consumer behavior. Highlighted articles cover multiple principles.

* *Field study (\*)*
* *Review paper or meta-analysis (R) with the letters for sections it covers after a colon (e.g., R:SFT if it also covers* ***S****ocial,* ***F****eelings & cognition, and* ***T****angibility.*
* *Chapter or conceptual paper (C)*

## Social Influence

|  |  |  |  |
| --- | --- | --- | --- |
| **Authors** | **Independent Variable(s)** | **Dependent Variable(s)** | **Moderators & Mediators** |
| Abrahamse and Steg 2013 (R) | Different social influence approaches (social norms, social networks, public commitment making, modelling, social comparison, feedback) | Resource Conservation | Visibility of social influences, group identity |
| Baca-Motes, Brown, Gneezy, Keenan, and Nelson 2012\* | Lapel pin to symbolize commitment (pin or no pin) | Commitment to practice environmentally sustainable decisions during hotel stay (towel hanging) | Specific or general commitment, no manipulation, message only, pin only |
| Bartels and Hoogendam 2011 | Social Identification with certain green consumer groups | Brand knowledge, brand attitude, buying behaviour |  |
| Bartels and Onwezen 2014 | Social representations, consumers identification with organic food | Intentions to buy products that make environmental and ethical claims. | Adherence to natural foods or technology,  Perception of food as a necessity |
| Bollinger and Gillingham 2012\* | Social interaction or peer effects (causal peer effects or social spillovers) | Diffusion of environmentally friendly technologies (solar photovoltaic panels) |  |
| Brough, Wilkie, Ma, Isaac, and Gal 2016 | Green behaviour, green vs. Non-green manipulation | Femininity index, self-reported femininity | Eco-friendly index |
| Burn and Oskamp 1986 | Persuasive communication, public commitment | Household recycling | A written persuasive communication, public commitment, both, or no persuasion |
| Cialdini, Demaine, Sagarin, Barrett, et al. 2006 | Descriptive norms or Injunctive norms | Theft of petrified wood |  |
| Cialdini, Reno, and Kallgren 1990 | Norm salience/proximity of norm message | Littering intention | Injunctive Norms |
| Dowd and Burke 2013 | Theory of Planned Behaviour scales of attitude, subjective norms, perceived behavioural control and intention | Intention to purchase sustainably sourced food | Measures of positive moral attitude and ethical self identity; and food choice motives. |
| Dwyer, Maki, and Rothman 2015 | Descriptive norms (the light status, demonstrated by confederate) | Pro-environmental behaviour (energy conservation behavior in public bathrooms) | Personal responsibility |
| Ferguson, Branscombe, and Reynolds 2011 | Intergroup comparison (comparison between current students with past or future students) | Willingness to perform sustainable behavior | Sustainable beliefs |
| Fielding, Terry, Masser, and Hogg 2008 | Questionnaire about past behaviour, attitudes, and behavioural control | Engagement in sustainable agricultural practices (riparian zone management) | Group norms, intergroup perceptions, group identification |
| Fornara, Carrus, Passafaro, and Bonnes 2011 | Social norms | Pro-environmental behaviors, such as household waste recycling | Injunctive and descriptive norms |
| Goldstein, Cialdini, and Griskevicius 2008 | Descriptive norms vs. Traditional appeal | Environment conservation in hotels (reusing towels) | Normative appeals |
| Gonzales, Aronson, and Costanzo 1988 | Auditor’s specific training in social-psychological principles | Effectiveness of a Home Energy Audit Program |  |
| Green and Peloza 2014 | Consumer benefits vs. Societal benefits | Environmentally Friendly Consumption | Multiple samples, product categories, and consumption and decision-making contexts. |
| Grinstein and Nisan 2009 | Government pro-environmental demarketing campaign | Deconsumption behavior of minority groups and the majority population (household-level data on actual behavior of consumers) | National attachment levels, education levels |
| Griskevicius, Tybur, and Bergh 2010 | Activating status motives | Desire to purchase green products | Private vs. Public shopping, cost of green products |
| Grolleau, Ibanez, and Mzoughi 2009 | Private vs. Public attributes signalled by product label | Success of eco-labelling schemes | Egoist vs. altruist consumer, products, countries |
| Gupta and Ogden 2009 | Green vs. non-green buyers (using trust, in‐group identity, expectation of others' cooperation and perceived efficacy) | Green buyer decision making (purchasing environmentally friendly products) |  |
| Han and Stoel 2017 | Theory of Planned Behaviour constructs | Behavioural intentions |  |
| Harland, Staats, and Wilke 1999 | Personal norms, Theory of planned behaviour | Participation in a behavioral change intervention program on environmental behavior |  |
| Jachimowicz, Hauser, O’Brien, Sherman, & Galinsky 2018 (R) | Descriptive norms, injunctive norms | Energy conservation | first-order personal beliefs vs second-order beliefs |
| Kronrod, Grinstein, and Wathieu 2012\* | Perceived importance of the issue at hand | Persuasiveness of assertive language, various environmental contexts (i.e., economizing water, recycling plastic containers, reducing air and sea pollution) |  |
| Mannetti, Pierro, and Livi 2004 | Theory of planned behaviour, self-identity dimensions | Household recycling | Similarity between personal identity and typical recycler identity |
| Minson and Monin 2012 | Meat-eaters perspective on what vegetarians think about them (before or after) | Reaction of meat-eaters to vegetarians |  |
| Nolan, Schultz, Cialdini, Goldstein, and Griskevicius 2008 | Normative social influence | Energy conservation behaviour |  |
| Olson, McFerran, Morales, and Dahl 2016 | Government assistance | Perception of moral judgements of consumer based on income | Income level, Price |
| Oskamp, Harrington, Edwards, Sherwood, et al. 1991 | Recycling behavior, attitudes, and knowledge | Household recycling behaviour | Demographic variables |
| Peattie 2010 (R:HI) | Consumer values, norms, and habits | Environmental sustainable consumption |  |
| Peloza, White, and Shang 2013 | Self-accountability  Discrepancy between a person's internal standards and actual behavior  Self-accountability priming  Presence (vs. absence) of others | Preference for products that promoted ethical attributes | Mediator: Desire to avoid anticipated guilt |
| Rabinovich, Morton, Postmes, and Verplanken 2012 | Inter-group comparative context | Changes in priority of personal environmental values, strength of environmental intentions and willingness to engage in sustainability‐related actions | Perceived in‐group stereotypes  Self-stereotype |
| Reno, Cialdini, and Kallgren 1993 | Injunctive vs. Social norms | Littering behaviour | Salience, clean or littered environment |
| Sadalla and Krull 1995 | Type of conservation behaviour | Perceived status of the performer |  |
| Schultz and Fielding 2014 | Common in-group identity model (means of communicating information about recycled drinking water) | Perception of recycled drinking water (acceptance, perceived knowledge, positive emotion, risk perceptions) | Super-ordinate identity of scientist |
| Schultz, Nolan, Cialdini, Goldstein, and Griskevicius 2007 | Normative messages about household recycling (and Injunctive messages) | Energy savings (either desirable or undesirable boomerang effect) | Existing energy consumption rate of households |
| Shang and Peloza 2016 | Ethical consumption | Degree of masculinity or femininity, degree of socially responsible identity | Self-benefit/ other benefit appeals and descriptive norms |
| Teng, Wu, and Liu 2015 | Individual characteristics of the Theory of Planned Behaviour model | Traveler intention to visit green hotels | Altruism construct, Affective component that motivates behavioral intention |
| Van der Werff, Steg, and Keizer 2013 | Biosphere values and environmental self-identity | Environmental preferences, intentions, and behaviour |  |
| Vugt, Griskevicius, and Schultz 2014 | 5 different biases | Environmental problems (resource depletion, restrain wasteful consumption, curb overpopulation, and foster green choices) |  |
| Welsch and Kühling 2009 | Reference groups and routine behaviour | Pro-environmental consumption (Subscription to green-electricity programs and buying organic food) | Economic and cognitive factors, consumption patterns |
| White and Simpson 2013 | Injunctive appeals, descriptive appeals, benefit appeals | Grass cycling or composting | Individual or collective self |
| White, Simpson, and Argo 2014 | Public or private setting, perspective of dissociative out-groups | Positive consumption behaviors | Group or self-affirmation |

## Habit

|  |  |  |  |
| --- | --- | --- | --- |
| **Authors** | **Independent Variable(s)** | **Dependent Variable(s)** | **Moderators & Mediators** |
| Abrahamse, Steg, Vlek, and Rothengatter 2005 (R:FC) | Antecedent strategies (i.e. commitment, goal setting, information, modeling) vs. consequence strategies (i.e. Feedback, rewards) | Energy consumption |  |
| Abrahamse, Steg, Vlek, and Rothengatter 2007 | Combining tailored information, goal setting (5%) and tailored feedback | Energy consumption (direct - gas, electricity and fuel and indirect -included in consumer goods), knowledge levels. | Group vs. Individual goals and feedback |
| Austin, Hatfield, Grindle, and Bailey 1993 | Prompt proximity | Recycling |  |
| Baltes and Hayward 1976 | Positive reinforcement, positive vs. Negative prompts | Littering |  |
| Bamberg 2006 | Context/Life changes (residential relocation) and incentive (free ticket) and schedule information | Public transportation use | Intention to change, public transport quality |
| Bolderdijk, Lehman, and Geller 2012\* | Biospheric (e.g. reduce carbon emissions) vs. economic (e.g. lower electricity bills) appeals | Tire check | Endorsement of biospheric values  Mediator: anticipated affect |
| Bolderdijk and Steg 2015 (C) | Economic (financial) incentives | Sustainable behavior | Cognitive impact of money |
| Bowles 2008 (R:FC) | Economic incentives | Prosocial behavior |  |
| Brothers, Krantz, and McClannahan 1994 | Container proximity (desktop vs. Central) | Recycling paper (long term) |  |
| Cairns, Newson, and Davis 2010 | Travel planning (better bus services, access to cycles and walking), monetary incentive for car-sharing (waiving parking charges) | Public transportation use (reducing commuter driving to work) |  |
| Chiang, Mevlevioglu, Natarajan, Padget, and Walker 2014 | Visual feedback (numerical, analogue, and emotional faces) | Energy consumption | Peer-ranking information (group comparison) |
| De Leon and Fuqua 1995\* | Group feedback | Recycling | Commitment |
| Delmas, Fischlein, and Asensio 2013 (R) | Individualized feedback via audits and consulting | Energy consumption | Pecuniary feedback and incentives increases use |
| Diamond and Loewy 1991 | Incentives (lottery vs. Cash) | Recycling |  |
| Donald, Cooper, and Conchie 2014 | Repeated car use (habit) and intentions | Transportation choices | Theory of planned behavior constructs |
| Everett, Hayward, and Meyers 1974 | Incentive token reinforcement | Transportation choices (bus ridership) |  |
| Fennis, Adriaanse, Stroebe, and Pol 2011 | Indirect persuasive appeals for implementation intentions | Sustainable product purchase | Vividness  Mediator: mental simulation |
| Fischer 2008 | Feedback | Energy consumption | Frequency, duration, content, breakdown, medium and presentation mode, comparisons, and combination with other instruments |
| Frederiks, Stenner, and Hobman 2015 (R:SC) | Social norms, heuristics and biases, penalties, and incentives | Energy consumption |  |
| Fullerton and Kinnaman 1995 | Penalty - fees | Waste disposal (recycling) | Illicit burning or dumping is an option |
| Gamba and Oskamp 1994 | Knowledge and concern for the environment | Recycling | Personal inconvenience |
| Geller, Bechtel, and Churchman 2002 (C) | Interventions | Pro-environmental behavior |  |
| Handgraaf, de Jeude, and Appelt 2013\* | Social vs. monetary rewards | Energy consumption | Public vs. private |
| Holland, Aarts, and Langendam 2006\* | Implementation intentions vs. eye-catching facility | Recycling |  |
| Hutton and McNeill 1981\* | Incentive - low cost/no cost | Energy consumption |  |
| Karjalainen 2011 | Feedback presentation | Energy consumption |  |
| Katzev and Johnson 1984\* | Incentive vs. Commitment | Change in residential electricity consumption | Short-term vs. long-term |
| Krause 2009 (C) | Penalties (taxes and tariffs, information), social norms | Reducing environmentally unsustainable consumption | Relates to anti-smoking policy |
| Kurz, Gardner, Verplanken, and Abraham 2014 (R) | Social psychological and social practice on habitual behaviour | Water and energy use, food consumption, transportation |  |
| Lehman and Geller 2004 (R:SIFT) | Antecedent, behavior, and consequence strategies | Air pollution, climate change, water pollution and depletion, solid waste, soil erosion and contamination, loss of green space and species diversity | Curtailment vs. efficiency, maintenance and permanent interventions |
| Ludwig, Gray, and Rowell 1998 | Placement of recycling bins - central vs. classroom | Percentage of cans recycled, percentage of cans in trash |  |
| McKenzie-Mohr 2000 (C) | Community-based social marketing strategy - commitment, prompts | Water usage; Purchasing products with recycled content |  |
| Osbaldiston and Schott 2012 (R:FC) | Cognitive dissonance, goal setting, social modeling, and prompts | Recycling, conserving gasoline and home energy consumption |  |
| Pichert and Katsikopoulos 2008\* | Default: green vs. grey energy | Electrical energy source |  |
| Schultz 1999\* | Group feedback -  Plea vs. plea plus information vs. plea plus neighborhood feedback vs. plea plus individual household feedback | Frequency of participation in recycling program; total amount of recycled material ; contamination |  |
| Schultz, Nolan, Cialdini, Goldstein, and Griskevicius 2007 | Descriptive vs. Injunctive norm - group feedback | Change in energy consumption | Initial levels of consumption (high vs. Low) |
| Schultz, Oskamp, and Mainieri 1995 (R:SIFC) | Personal variables (personality, demographics, and attitudes of environmental concern) and situational variables (prompts, public commitment, normative influence, goal setting, removing barriers, providing rewards, and feedback) | Recycling |  |
| Siero, Bakker, Dekker, and Van Den Burg 1996 | Individual vs. Comparative feedback | Energy consumption | Length of time |
| Slavin, Wodarski, and Blackburn 1981\* | Resident meeting, letters, comparison with predicted amount of energy use | Electricity consumption; energy cost savings | Timing of reduction in energy use; percentage of savings passed onto residents |
| Steg and Vlek 2009 (R:S) | Environmental psychology - costs and benefits, moral and normative concerns and affect | Pro environmental behavior |  |
| Theotokis and Manganari 2015 | Opt out vs. opt in default policies; forced choice | Green service use (e.g. Hotel towel reuse, replacing bank statements with electronic ones | Environmental consciousness; Negotiated (reciprocal) cooperation strategy  Mediator: anticipated guilt |
| Thøgersen 2012\* | Context/Life changes (e.g., a recent move); Free travel card | Reducing driving; using public transport |  |
| Tiefenbeck, Goette, Degen, Tasic, et al. 2016\* | Real time, specific feedback vs. Broader feedback | Water usage while showering |  |
| Verplanken 2011 (C) |  | Changing unsustainable habits |  |
| Verplanken and Roy 2016\* | Context/life changes - recent move; intervention promoting sustainable behaviors vs. Control | Change in 25 environment related behaviours | Timing of window of opportunity; controlling for past behaviour, habit strength, intentions, perceived control, biospheric values, personal norms, and personal involvement. |
| Verplanken, Walker, Davis, and Jurasek 2008 | Context/life changes (e.g., a recent move); importance of values | Frequency of car usage | Environmental concern |
| Walker, Thomas, and Verplanken 2015 | Context/life changes (e.g., a recent move - office relocation) | Car usage, public transport use | Travel mode change |
| Werner, Rhodes, and Partain 1998 | Schema sensitive signs | Change in volume of bins recycled per day; Cleanliness; Increases in cafeteria patrons' knowledge about polystyrene recycling. |  |
| Wilhite and Ling 1995\* | Informative energy bill | Energy consumption; discussing the bill | Frequency of bill |

## Individual Self

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| **Authors** | **Independent Variable(s)** | **Dependent Variable(s)** | **Moderators & Mediators** |
| Abrahamse, Steg, Vlek, and Rothengatter 2007 | Combining tailored information, goal setting (5%) and tailored feedback | Energy consumption (direct - gas, electricity and fuel and indirect -included in consumer goods), knowledge levels. | Group vs. individual goals and feedback |
| Alwitt and Pitts 1996 | General environmental concern | Purchase intentions for disposable diapers | Product specific attitudes about consequences of its use  product’s environmental attributes |
| Anderson and Cunningham 1972 | Being a socially responsible consumer | Discriminating social degree of consciousness | Demographic variables  Socio-psychological variables |
| Bahl, Milne, Ross, Mick, et al. 2016 | Mindfulness | Consumption process | Attention to inner and outer stimuli  acceptance of inner and outer stimuli |
| Balderjahn, Peyer, Seegebarth, Wiedmann, and Weber 2018 | Sustainability concern | Sustainable purchases | Expectations, attitudes, and values |
| Bamberg, Hunecke, and Blöbaum 2007 | Personal norms | Decision to use public transportation | Anticipated feelings of guilt  Perceived social norms |
| Bandura 1977 | Psychological procedures | Self-efficacy  Amount of effort expended  Length of time sustained in face of obstacles | Expectations of personal efficacy |
| Barber and Deale 2014 | Mindfulness | Awareness of hotels’ sustainable practices, responsiveness to hotels’ sustainable practices | Demographic characteristics  Concern for society  Preference for mindful services  Benefits sought |
| Bodur, Duval, and Grohmann 2015 | Text only prediction | Preference for environmentally friendly products | Self construal |
| Brough, Wilkie, Ma, Isaac, and Gal 2016 | Green feminine stereotype | Adopting green behavior | Gender identity maintenance |
| Catlin and Wang 2013 | Option to recycle | Resource usage (paper) |  |
| Chang 2011 | Green product claims | Attitudes towards green products, believability of ad and green claim | Level of green effort (Low, moderate, high) |
| Cleveland, Kalamas, and Laroche 2005 | Environmental Locus of Control - external (biospheric‐altruism and corporate skepticism) and internal (economic motivation and individual recycling efforts) | Pro-environmental behavior |  |
| Cornelissen, Pandelaere, Warlop, and Dewitte 2008 | Positive cueing | Self-perception, Choice of environmentally friendly products |  |
| Daamen, Staats, Wilke, and Engelen 2001 | Tailored vs. nontailored message | Pro-environmental behavior of garage employees, accuracy of knowledge | Additional information (did not have an effect) |
| Devezer, Sprott, Spangenberg, and Czellar 2014 | Sub-goal performance (environmental IQ test) | Environmental end goal commitment, environmental sub-goal intentions |  |
| Diamantopoulos, Schlegelmilch, Sinkovics, and Bohlen 2003 | Socio-demographic variables | Ability to profile green consumers | Measures of environmental consciousness |
| Dickerson, Thibodeau, Aronson, and Miller 1992 | Dissonance induction - Reminder of past hypocritical behavior | Length of shower | Public commitment  to shorter showers |
| Dickinson 2009 (C) | Immorality projects | Human response to climate change | Cultural world views on materialism, spirituality, politics & society |
| Dietz, Kalof, and Stern 2002 | Gender | Environmental concern | Altruism, self-interest,  traditionalism, openness to change |
| Donnelly, Lamberton, Reczek, and Norton 2017 | Social recycling (vs. trash, recycling and donating to non-profits) | Consumer happiness |  |
| Dunning 2007 (R) | Personal belief. positive self-views | Consumer behavior, purchase decisions | Self‐image motives (endowment, compensation, affirmation, and licensing effects). |
| Eagly 2009 | Gender | Prosocial behavior | Mediator: social expectations |
| EdingerSchons, Sipilä, Sen, Mende, and Wieseke 2018 | Intrinsic appeal,  extrinsic appeal,  joint appeal | Purchase intention for socially responsible goods | Involvement with sustainable consumption |
| Ellen, Wiener, and CobbWalgren 1991 | Perceived consumer effectiveness | Pro-environmental behavior | Demographics,  political affiliation |
| Evans, Maio, Corner, Hodgetts, et al. 2013 | Self-interested vs. self-transcending reasons (for car-sharing) | Recycling rates | Self-interest reasons  self transcendent reasons |
| Feygina, Jost, and Goldsmith 2010 | System justification tendencies | Pro-environmental action, Denial of environmental realities | Political conservatism,  national identification,  gender |
| Fraj and Martinez 2006 | Personality | Ecological behavior | Agreeableness  extroversion  conscientiousness  openness  neuroticism |
| Garvey and Bolton 2017 | Eco-product choice | Downstream environmentally responsible behavior | Environmental consciousness  goal satiation  prosocial self perceptions |
| Gifford and Nilsson 2014 | Social influences  Personal influences | Pro-environmental concern | Personal factors  social factors |
| Gilg, Barr, and Ford 2005 | Sustainable Lifestyle | Household green consumption | Demographic factors |
| Gleim, Smith, Andrews, and Cronin Jr 2013 | Individual/purchase barriers | Consumers’ evaluations of green products in retail stores | Informational product cues |
| Granzin and Olsen 1991 | Individual characteristics including demographics, personal values, information, knowledge, interpersonal influences, helping related motivations | Donating items for reuse,  Walking,  Recycling newspapers |  |
| Green and Peloza 2014 | Consumer benefit Appeals  Societal benefit Appeals | Preference for environmentally friendly products | Public accountability  private setting |
| Griskevicius, Cantú, and Vugt 2012 | Adaptive tendencies (Self-interest, motivation for relative status, proclivity to unconsciously copy others, short sightedness,  proneness to disregard impalpable concerns) | Modern environmental problems  Social problems |  |
| Gromet, Kunreuther, and Larrick 2013 | Political affiliation and ideology | Individual adoption of energy-efficient technology | Mediator: psychological value |
| Guagnano, Dietz, and Stern 1994 | Egoistic considerations  Altruistic considerations | Willingness to pay for environmental quality |  |
| Guagnano, Stern, and Dietz 1995 | Possessing a recycling bin  Perceived Costs | Recycling behavior | Strength of external conditions  Strength of attitudes |
| Hart and Nisbet 2012 | Political partisanship | Support for climate change | Social identity  motivated reasoning  persuasion |
| Hughner, McDonagh, Prothero, Shultz, and Stanton 2007 (R) | Demographics  Beliefs, motivations, perceptions, and attitude | Organic food consumption |  |
| Jansson, Marell, and Nordlund 2010 | Personal norms  Beliefs  Norms  Habit Strength | Curtailment behaviors  Consumer adoptions of eco-innovations | Attitudinal factors  previous adoption |
| Johnstone and Tan 2015 | Green perception | Purchase of green products | Green stigma  green reservations, Green attitude behavior gap |
| Juhl, Fenger, and Thøgersen 2017 | Purchase of organic products | Organic food consumption across categories |  |
| Karmarkar and Bollinger 2015 | Using a reusable grocery bag | Purchasing of indulgent foods, Purchasing of organic foods | Competing goals  store policies |
| Katzev and Johnson 1984 | Monetary Incentives and Foot-in-the-Door Strategies | Electrical energy conservation | Commitment |
| Kinnear, Taylor, and Ahmed 1974 | Personality characteristics  Socioeconomic characteristics | Ecological concern | Perceived consumer effectiveness |
| Lanzini and Thøgersen 2014\* | Monetary inducements and verbal praise | Behavioral spillover in the environmental domain | Monetary inducements  verbal praise |
| Laroche, Bergeron, and BarbaroForleo 2001 | Consumers who purchased eco-friendly products | Willingness to pay more for environmentally friendly products | Demographic profile, attitudes,  Values, knowledge, behavioral profile |
| Lokhorst, Werner, Staats, van Dijk, and Gale 2013 | Commitment making | Pro-environmental behaviors | Psychological constructs |
| Luchs and Kumar 2017 | Effect of trade off (hedonic or utilitarian) | Sustainable product choice | Product type |
| Luchs and Mooradian 2012 | Sex | Sustainable consumer behavior | Personality |
| Luchs, Naylor, Irwin, and Raghunathan 2010 | Gentleness product attributes and strength product attributes | Consumer preferences, Consumer perception of product ethicality | Type of benefit consumers’ value |
| Mainieri, Barnett, Valdero, Unipan, and Oskamp 1997 | Environmental concern Environmental concern Consumer beliefs | Green buying | Awareness of environmental impact, environmental beliefs  environmental attitudes  demographic variables  pro-environmental behaviors |
| Mazar and Zhong 2010 | Consumption of Green Products | Social behaviors  Ethical behaviors | Exposure to green products  purchasing of green products |
| Minson and Monin 2012 | Salience of Moral Reproach | Evaluation of vegetarians | Judged valence |
| Murphy, Kangun, and Locander 1978 | Race | Reaction to ecological information about household products | Environmentally less destructive alternatives  importance of ecological information |
| Murtagh, Gatersleben, Cowen, and Uzzell 2015 | Technology | ‘Green’ behavior | Automation |
| Newman, Gorlin, and Dhar 2014 | Firm intentions, Resource allocation | Evaluation of product and firm |  |
| Nisbet, Zelenski, and Murphy 2009 | Nature relatedness scale | Environmental concern  Environmental behavior | Affective,  cognitive and  experiential aspects |
| Nolan, Schultz, Cialdini, Goldstein, and Griskevicius 2008 | Descriptive Norms | Energy consumption |  |
| Ölander and Thøgersen 2014 | Mental Shortcuts - anchoring, default and norms | Energy saving behavior | Personal involvement |
| Paavola 2001 | Utilitarian vs. Nonutilitarian Environmental Information | Individual action | Self values  welfare values |
| Panno et al. 2018 | Need for cognitive closure | Pro-environmental behavior, Belief in climate change | Political ideology |
| Paul, Modi, and Patel 2016 | Environmental concern | Green product purchase intention | Consumer attitude  perceived behavioral control |
| Peattie 2001 (C) | Degree of confidence, degree of compromise | Green consumption, identifying green consumers |  |
| Peattie 1999 (C) | Philosophy of sustainability, strategic marketing planning processes | The degree of change made by companies towards sustainability |  |
| Peloza, White, and Shang 2013 | Self-accountability (heightened by situational factors) | Preference for products that promoted ethical attributes | Awareness of the discrepancy between a person's internal standards and actual behavior, self-accountability priming, and the presence of others in the decision context. Desire to avoid anticipated guilt |
| Phipps, Ozanne, Luchs, Subrahmanyan, et al. 2013 (C) | Reciprocal determinism | Sustainable consumption | Personal,  environmental and behavioral factors |
| Prooijen and Sparks 2014 | Initial beliefs | Acceptance of anthropogenic climate change evidence | Self affirmation  self-reflection |
| Roberts 1993 | Gender | Socially Responsible Consumer Behavior Scale | Education |
| Sachdeva, Jordan, and Mazar 2015 (R) | Structural,  exogenous and  endogenous factors | Green consumerism, positive and negative spillover |  |
| Schuitema and Groot 2015 | Product attributes | Purchase intentions | Biospheric values |
| Schwartz, Bruine de Bruin, Fischhoff, and Lave 2015 | Advertisements emphasizing intrinsic vs. extrinsic vs. both benefits | Willingness to enroll in energy-saving programs |  |
| Schwepker Jr and Cornwell 1991 | Attitude toward ecologically conscious living and littering, locus of control, perception of pollution as a problem | Willingness to purchase ecologically packaged materials |  |
| Semenza, Hall, Wilson, Bontempo, et al. 2008 | Concern about climate change, demographics | Energy usage, gasoline consumption, and recycling self report |  |
| Sheth, Sethia, and Srinivas 2011 (C) | Mindful consumption | Reduce acquisitive, repetitive and aspirational consumption |  |
| Small and Dender 2007 | Rebound effect | Travel total | Income  fuel prices |
| Sorrell, Dimitropoulos, and Sommerville 2009 (R:FC) | Cheaper energy services | Household energy Consumption |  |
| Sparks, Jessop, Chapman, and Holmes 2010 | Self affirmation manipulation | Level of denial  Perception of personal involvement,  Intentions to increase recycling behavior | Threatening information,  recycling information |
| Steg 2015 (C) | Individual, Social and  Situational cues | Sustainable consumption |  |
| Steg, Bolderdijk, Keizer, and Perlaviciute 2014 (C) | Normative goals | Pro-environmental actions | Values, situational factors |
| Stern and Dietz 1994 | Value orientation  Beliefs | Environmental concern |  |
| Stern, Dietz, and Kalof 1993 | Value orientation (egoistic, social-altruistic, or biospheric), | Willingness to take political action and pay through taxes | Gender |
| Tiefenbeck, Staake, Roth, and Sachs 2013 | Water conservation campaign | Electricity consumption | Moral licensing |
| Trudel, Argo, and Meng 2016 | Consumers’ identity | Disposal behavior, Recycling behavior | Consumer linked product |
| Truelove, Carrico, Weber, Raimi, and Vandenbergh 2014 | Internal vs. External motivator vs.  Decision mode | Performance of a pro-environmental behavior after an initial pro-environmental behavior (spillover effect) | Characteristics of and similarity of initial and subsequent pro-environmental behaviors |
| Van der Werff, Steg, and Keizer 2014 | Biospheric values | Environmental self-identity | Past environmental behavior |
| Verplanken and Holland 2002 | Values | Environmentally friendly consumer choices | Self concept  value activation |
| Wang, Krishna, and McFerran 2016 | Perception of the Firm as green | Consumers’ conservation behavior | Firm requests to consumers’ to conserve,  commitment and price image |
| White, MacDonnell, and Dahl 2011 | Framing (loss vs. Gain) | Recycling intentions and behaviors | Construal level; temporal construal |
| White and Simpson 2013 | Injunctive vs.  Descriptive vs.  Benefit appeal | Engagement in unfamiliar sustainable behaviors | Collective vs.  individual self activation |
| Wiidegren 1998 | Personal norms  New environmental paradigm scale | Self-reported pro-environmental behavior, Willingness to pay higher prices for eco-friendly food |  |
| Winterich, Reczek, and Irwin 2017 | Memory preservation, perceived identity loss | Donations |  |
| Zane, Irwin, and Reczek 2015 | Negative social comparison | Denigration of ethical others, commitment to ethical values | Second opportunity to act ethically, justification |

## Feelings and Cognition

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| **Authors** | **Independent Variable(s)** | **Dependent Variable(s)** | **Moderators & Mediators** |
| Antonetti and Maklan 2014 | Pride and guilt | Perceived consumer effectiveness, agency, sustainable consumption choices | Causal attributions and rationalizations |
| Aspara, Luo, and Dhar 2017\* | Intelligence | Responsiveness to a pro-environmental tax | Numeric intelligence vs. Verbal and spatial logic intelligence |
| Banerjee, Gulas, and Iyer 1995 | Content analysis | Sponsor type (for-profit vs. Non-profit), ad focus (advertiser vs. Consumer), and depth of ad |  |
| Bissing-Olson, Fielding, and Iyer 2016 | Pride vs. Guilt | Recycling & disposal, water conservation, saving electricity, reusing paper and containers, taking public transportation | Descriptive norms |
| Borin, Cerf, and Krishnan 2011 | Environmental information vs. No information, positive vs. Negative information | Consumer perception of product quality, value, and purchase intentions |  |
| Bull 2012 | Labels with or without: monetisation of efficiency, carbon emissions, operational life impacts, losses vs. Savings | Willingness-to-pay for efficient washing machines |  |
| Camilleri and Larrick 2014 | Metric (consumption of gas vs. Cost of gas), scale (100 miles vs. 100,000 miles) | Preference for fuel efficient vehicles |  |
| Carrus, Passafaro, and Bonnes 2008 | Anticipated emotions, attitudes, subjective norms, perceived control, past behaviour and desire | Intentions to use public transportation and to recycle household waste |  |
| Chen and Chang 2013 | Green-washing | Green trust, green consumer confusion and green perceived risk |  |
| Corral-Verdugo, Bonnes, Tapia-Fonllem, Fraijo-Sing, et al. 2009 | Affinity towards biological and socio-cultural diversity | Collecting and recycling used paper, buying products in refillable packages, and turning down the air conditioning when leaving home |  |
| Feldman and Hart 2018 | News articles about causes and impacts of climate change vs. mitigation actions | Hope, fear, anger, support for climate mitigation policies | Political ideology |
| Ferguson, Branscombe, and Reynolds 2011 | Comparison with future vs. past groups | Sustainable transport choices, energy and water conservation, and advocacy |  |
| Giebelhausen, Chun, Cronin Jr, and Hult 2016 | Voluntary participation (vs. non-participation) in a green program | Satisfaction with service experience | Incentives for self, others, both, or none |
| Gifford 2011 (R:SI) | Seven barriers (limited cognition, ideological worldviews, comparisons with key other people, sunk costs and behavioral momentum, discredence toward experts, perceived risks, and positive but inadequate behavior change) | Greenhouse-gas mitigation behavior |  |
| Gifford and Nilsson 2014 (R:SI) | Personal and social influences | Pro‐environmental concern and behaviour |  |
| Grob 1995 | Environmental attitudes | 21 items including transportation, separation of household refuse, and amount of energy used | Personal-philosophical values and emotions vs. Factual knowledge |
| Grunert, Hieke, and Wills 2014 | Consumer motivation and understanding | Sustainability label use | Environmental vs. Ethical labels, food products vs. Other products |
| Hardisty, Johnson, and Weber 2010 | Carbon tax vs. Offset framing | Choice of product with vs. Without carbon fee, political support | Political affiliation, thought order |
| Hardisty and Weber 2009 | Gain vs. Loss, environmental vs. Financial vs. Health domain | Discount rates |  |
| Horne 2009 (R) | Eco-label types | Sustainable product choices | Behavioural, social practice, institutional and infrastructure factors |
| Jiménez and Yang 2008 | Low vs. high guilt appeal levels | Attitude towards the advertisement and the brand | Angry-irritated emotion and self-conscious emotion |
| Kaiser 2006 | Anticipated guilt feelings, self-interest | Intention to act in a pro-environmental manner (48 different behaviors) |  |
| Kaiser and Shimoda 1999 | Moral vs. conventional responsibility feelings | 38 ecological behaviors |  |
| Kallbekken, Sælen, and Hermansen 2013\* | Lifetime energy cost labels (vs. no label), staff training (vs. no training) | Energy efficient product choices | Fridge-freezers vs. tumble driers |
| Kals, Schumacher, and Montada 1999 | Emotional affinity toward nature, indignation and interest in nature | Commitments to nature-protective behavior |  |
| Kidwell, Farmer, and Hardesty 2013 | Individualizing vs. Binding appeals | Recycling, CFL purchase, water conservation | Political ideology |
| Kollmuss and Agyeman 2002 (R) | Environmental knowledge and environmental awareness, demographic factors, external factors and internal factors | Pro-environmental behavior |  |
| Levine and Strube 2012 | Knowledge about the environment, explicit attitudes | Recycling, using public transportation, and turning off lights and electrical appliances when not in use | Gender, age |
| Li 2014 | High vs. low threat messages | Attitudes and behavioral intentions toward global warming | High vs. low efficacy messages |
| Lowe, Brown, Dessai, de França Doria, et al. 2006 | Viewing (vs. not) | Likelihood judgments, concern, motivation, and responsibility for global climate change | Science fact from dramatized science fiction |
| Luchs and Mooradian 2012 | Gender, agreeableness, and openness | Environmental attitudes, shoe choice |  |
| Mallett 2012 | Eco-guilt | Recycling, buying a fuel-efficient car | Personal vs. societal standards |
| Mallett, Melchiori, and Strickroth 2013 | Carbon-footprint larger vs. Smaller than average | Guilt, support for a pro-environmental group |  |
| Manget, Roche, and Münnich 2009 | Product category, perceived benefits, country | Consumer demand for green products |  |
| McKenzie-Mohr 2011 (R:SH) | Commitments, social norms, social diffusion, prompts, communication, incentives, convenience | Sustainable behavior |  |
| McKenzie-Mohr 2000 | Community‐based social marketing | Backyard composting, Water efficiency |  |
| Meng and Trudel 2017\* | Negative emoticons | Recycling proportion |  |
| Min, Azevedo, Michalek, and de Bruin 2014 | Operating cost labeling, political ideology | Efficient light bulb choice, implicit discount rate |  |
| Muralidharan and Sheehan 2018 | Levels of guilt, egotistic vs. Biospheric concerns | Reusable bag use | Gender |
| Myers, Nisbet, Maibach, and Leiserowitz 2012 | Climate framing (risks to the environment, public health, or national security) | Emotional reactions, support for climate change mitigation and adaptation | Audience segments already doubtful or dismissive of the issue |
| Neumann, Roberts, and Cauvin 2012 (C) | Information overload | Evaluation of subordinate performance, evaluation of firm performance |  |
| O’Neill and Nicholson-Cole 2009 | Fearful messages (visual and iconic representations) | Attention to climate change, personal engagement |  |
| Onwezen, Antonides, and Bartels 2013 | Anticipated pride and guilt, personal norms | Buying environmentally friendly products and travelling in environmentally friendly ways |  |
| Osbaldiston and Schott 2012 (R) | Different treatments (e.g., cognitive dissonance, goal setting, social modeling) | Pro-environmental behavior | Different behaviors (recycling, conserving gasoline, energy conservation) |
| Osbaldiston and Sheldon 2002 (C) | Internalized motivation | Future Intentions to Perform Goals (such as taking shorter showers or turning off lights) |  |
| Parguel, Benoît-Moreau, and Larceneux 2011 | Independent sustainability ratings | Responses to CSR communication | Negative vs. positive ratings |
| Peattie and Peattie 2009 (R:S) | Social marketing | Case study of tobacco use |  |
| Peloza, White, and Shang 2013 | Self-accountability, guilt appeals | Preference for ethical product attributes (e.g., recycled material, lower carbon emissions, less packaging) | Awareness of discrepancy, self-accountability priming, the presence of others |
| Peter and Honea 2012 | Guilt, hope, pride, and optimism | Disposable plastic bottled water consumption |  |
| Rezvani, Jansson, and Bengtsson 2017 | Anticipated emotions, personal moral norms |  |  |
| Schwartz and Loewenstein 2017 | Affective (sadness) vs. Non-affective videos | Time devoted to an energy-footprint calculator and donations to an environmental organization |  |
| Sevillano, Aragonés, and Schultz 2007 | Images of animals (harmed vs. In nature), perspective taking instructions (vs. Objective instructions or instructions) | Biospheric and egotistic environmental concerns | Dispositional empathy, empathic dimension of personal distress, |
| Smith and Leiserowitz 2014 | Discrete emotions (worry, interest, and hope) vs. Cultural worldviews, negative affect, image associations, and socio-demographic variables | Climate policy support |  |
| Steenhaut and Kenhove 2006 | Anticipation of guilt, salience of interpersonal consequences | Ethical intentions (to return overpayment) |  |
| Steg 2005 | Instrumental, symbolic and affective functions | Car use | Driving frequency, car attitudes, gender, age |
| Stern 1999 | Personal factors (information) vs. Contextual factors (material incentives) | Energy efficiency behavior (audits, loans, rebates) |  |
| Sun and Trudel 2017 | Type of disposal (recycling vs. Garbage) | Materials use (cups, gift wrapping, packaging, scrap paper) | Costs of recycling (financial, physical, and mental) |
| Taufique, Vocino, and Polonsky 2017 | Environmental and eco-label knowledge, positive environmental attitudes, trust in eco-labels | Choosing recycling, lower pollution, reusable, energy efficiency |  |
| Thøgersen 2000 | Environmental goals, beliefs, knowledge, trust, availability | Attention towards eco-labels |  |
| Ungemach, Camilleri, Johnson, Larrick, and Weber 2017 | Attribute translation (fuel cost in "dollars" vs. "CO2"), environmental attribute present vs. Absent | Fuel efficient car choice | Environmental values, tutorial presented (or not) |
| Wang, Mukhopadhyay, and Patrick 2017\* | Cuteness | Recycling, trying products made of recycled material, animal protection | Approach motivational orientation |
| White, MacDonnell, and Dahl 2011 | Framing (loss vs. Gain) | Recycling intentions and behaviors | Construal level; temporal construal |

**Tangibility**

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| **Authors** | **Independent Variable(s)** | **Dependent Variable(s)** | **Moderators & Mediators** |
| Akerlof, Maibach, Fitzgerald, Cedeno, and Neuman 2013 | Beliefs about global warming | Percentage of people reporting experiencing global warming; types of global warming experiences; historical data records; perceptions of global warming risk and policy implications |  |
| Amel, Manning, Scott, and Koger 2017 (R:SIFT) | Psychological factors, socio-political factors, and organizational factors | Ecologically responsible behaviors |  |
| Arnocky, Milfont, and Nicol 2014 | Consideration of future consequences ; future priming | Ecological concern and ecological behavior motivation |  |
| Atasoy and Morewedge 2018 | Type of good (physical vs. digital) | Valuation | Ownership status (rental vs. Purchase)ris; identity relevance; need for control  Mediator: perceived ownership |
| Belk 2013 (C) | Digital consumption | Impacts on the extended self-concept |  |
| Carette et al. 2012 | Green consumption | Consumer confusion and trust  Credibility and compatibility |  |
| Chen and Chang 2013 | Perceptions of green-washing | Consumer confusion; perceived green risk; green trust |  |
| Cherrier 2009 (C) | Cultural discourses | Anti-consumption via voluntary simplicity and culture jamming |  |
| Devine-Wright and Howes 2010 | Place attachment | Perceived outcomes, emotional response, attitude, and behavioral response |  |
| Donnelly, Lamberton, Reczek, and Norton 2017 | Disposition method | Environmental impact perceptions; prosocial impact perceptions; and affective outcomes |  |
| Gifford 2014 (R:SIF) | Psychological barriers | Sustainable behaviors |  |
| Gifford 2011 (R:SIF) | Personal and social factors | Environmental concern |  |
| Griskevicius, Cantú, and Vugt 2012 | Adaptive tendencies (Self-interest, motivation for relative status, proclivity to unconsciously copy others, short sightedness, | Modern environmental problems  Social problems |  |
| Hardisty and Weber 2009 | Message type (loss vs. Gain) | Discounting | Outcome type (environmental, financial, and health) |
| Joireman, Van Lange, and Van Vugt 2004 | Social value orientation' concern for future consequences | Pro-environmental intentions and behaviors; perceived pro-environmental consequences | Perceived pro-environmental consequences |
| Leiserowitz 2006 | Affect, imagery, and values | Climate risk perceptions and policy support |  |
| Li, Johnson, and Zaval 2011 | Threat (low vs. High) | Attitudes and behavioral intentions | Efficacy |
| Marx, Weber, Orlove, Leiserowitz, et al. 2007 (C) | Experiential and analytical processing | Understanding and reacting to climate information |  |
| Paswan, Guzmán, and Lewin 2017 | Present time-orientation, future time orientation, attitude towards nature, and beliefs about human-nature balance | Reports of active, supportive, and lifestyle environmentally sustainable behaviors |  |
| Pindyck 2007 (C) | Uncertainty | Reaction to environmental issues |  |
| Reczek, Trudel, and White 2018 | Construal level | Product choice; purchase intentions; future focus | Appeal type (eco-friendly vs. Traditional); product description (detailed vs. General) |
| Scannell and Gifford 2013 | Messages of local vs. Global impacts; place attachment | Climate change engagement |  |
| Spence, Poortinga, and Pidgeon 2012 | Dimensions of psychological distance | Climate change concerns; behavioral intentions |  |
| Van Boven 2005 (C) | Experiential and material purposes | Happiness |  |
| Vargo and Lusch 2004 (C) | Moving the focus of marketing from the exchange of tangible goods to services |  |  |
| Vugt, Griskevicius, and Schultz 2014 (R:SIT) | Human biases | Sustainable behaviors |  |
| Wade-Benzoni, Tenbrunsel, and Bazerman 1997 (R:F) | Psychological biases | Environmental conflict resolution |  |
| Weber 2010 (R:IF) | Psychological predictors | Perceptions of climate change |  |
| Weber 2016 (R:IF) | Psychological predictors | Perceptions of climate change |  |
| White, MacDonnell, and Dahl 2011 | Framing (loss vs. Gain) | Recycling intentions and behaviors | Construal level; temporal construal |
| Zaval, Markowitz, and Weber 2015 | Legacy motivations | Donations to an environmental charity, pro-environmental intentions, and climate-change beliefs. |  |