PART I:

Review of Behavior Change Approaches

Part I of III from:

Behavior Change Interventions in Practice:

A synthesis of criteria, approaches, case studies & indicators

STAP SCIENTIFIC AND TECHNICAL ADVISORY PANEL
An independent group of scientists that advises the Global Environment Facility

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Introduction

There are many approaches, tools, and perspectives on how to change behavior. Behavior change approaches are particularly valuable because they help to distill the many insights about human behavior into something concrete and accessible as well as offer a series of steps for designing behavioral solutions. In other words, it is not enough to understand behavioral and social science principles; one must also know how to put those into practice (Wendel, 2020).

In the last decade, the field of 'behavioral design' has emerged as a blend of insights from the design and behavioral and social science fields (Datta & Mullainathan, 2014; Wendel, 2020). The field of design provides a useful sequencing strategy for generating solutions and an explicit focus on centering the target actor. It further provides a creative and innovative mindset for designing solutions that go beyond individuals and that seek to transform larger systems (Reid & Schmidt, 2018). Design thinking and Human-Centered Design are especially popular among people who do this work. The behavioral and social sciences layer on research about people's motivations and barriers for behavior change and intervention strategies that could prove most impactful. For many designers today, behavioral design also involves an explicit focus on 'behavior change for good,' meaning solutions that promote behaviors that support human wellbeing (Salzer, 2020).

In this section, we describe the similarities and differences between six leading behavior change approaches. We also offer best practice recommendations for selecting a formal behavior change approach. Then we provide a more in-depth review of each of the six behavior change approaches, focusing on the insights, methodologies, and resources for creating effective behavioral interventions. The selection criteria for the six approaches in this section were the following (See Appendix A for the complete list of approaches we considered):

- Behavioral: The approaches all have a specific framework for understanding and analyzing insights from the behavioral and social sciences
- Design-focused: The approaches detail a methodology for designing behavior change interventions
- Environmental: The approaches were relevant for environmental work or had been applied to behavior change problems in any of the GEF's focus areas

There is significant overlap among these approaches in terms of their understanding of the behavioral and social sciences and in their design methodologies, yet each has unique strengths and insights. For each approach, we highlight its origin, the behavioral principles or framework used to design solutions, the design steps or processes, as well as any known applications of the approach in environmental contexts, particularly in GEF focus areas. We then evaluate each approach's strengths and weaknesses based on the following criteria:

- Variety and strength of behavioral principles
- Comprehensiveness of design steps (from understanding the problem to assessing and monitoring outcomes)
- Consideration of behavior change durability and evaluation
- Ability to work among diverse sets of actors and at different scales of governance
- Integration of the socio-ecological context for a behavior change problem
- Emphasis for design steps to be non-linear, adaptive, and iterative
- Consideration of ethics and power in designing for behavior change

We have used a dot system (● ● ○) to label how strong an approach is for each criterion: dark blue indicates the criterion is met comprehensively and missing no elements; light blue indicates the approach is not meeting one core element of the criterion, and white indicates that the approach is not meeting multiple elements of the criterion. These evaluations can be used to assess the relative emphasis each approach gives to elements of designing for behavior change and identify where there is room for ongoing improvement in the field.

Here is a summary table of how each of the approaches fared on the seven criteria:

Criteria	Behavior Change Approach					
	BIT	COM-B	OECD	Rare	World Bank	Ideas42
Strength of behavioral principles	●	●	●	●	●	●
Comprehensive design steps	●	●	●	●	●	●
Durability and evaluation	●	●	●	●	○	●
Diverse actors and scales	●	●	●	●	●	●
Socio-ecological context integration	●	●	●	●	●	●
Emphasis on non-linearity, iteration	●	●	●	●	●	●
Ethics and power consideration	○	●	●	●	●	●

Observations and Recommendations For Selecting a Behavior Change Approach

Based on the criteria we used to evaluate behavior change approaches, we observed several patterns in terms of their similarities and differences. We also present a number of recommendations for what comprises a strong behavior change approach for each of the above evaluation criteria.

Behavior Change Approach Similarities and Differences

The six chosen approaches have more similarities than differences. They have all been highly influenced by the latest behavioral and social science as well as design thinking. Additionally, all of them are strong in their applicability to diverse sets of actors and scales of governance. Beyond that, there are minor differences in the behavioral principles and design steps they use to guide the design of behavior change interventions.

Behavioral principles

Some approaches describe their behavioral principles and strategies as broad categories (e.g., automatic thinking, social influences, choice environment); others are more specific and target behavioral or social principles directly (e.g., messenger effect, salience, loss aversion). Some approaches distinguish between rational and irrational forms of thinking in the way they describe behavioral insights, and some also distinguish between 'fast' and 'slow' or System I and System II thinking. These are categorical distinctions that could create false dichotomies with regards to the way in which decisions are made. These types of thinking may lead to rigid boundaries around the selection of certain strategies (Osman, 2004). For example, the use of emotional framings can appeal to our 'automatic' processing system given how we respond to emotional events, but it can also be intensely rational in pursuing individual needs (e.g., seeking safety from a threat; Lerner et al., 2015). Finally, most approaches include behavioral principles that represent 'new' insights from behavioral science that depart from the more traditional rational actor models. This also means that they tend to exclude strategies such as providing material incentives, information, or enacting regulations. In contrast, the COM-B and Rare approaches include these strategies to highlight their value and role in changing behavior, even if not on their own.

Design steps

The design steps for all approaches are very similar to one another. They all include a step to define the target behavior and target outcomes, understand and analyze the motivations and barriers of the target actors, design solutions, and implement those ideas. They differ where the steps 'start' and 'end'; some approaches are more explicit about spending time early on to gather details about the context in which a behavior occurs. Others spend more time detailing how to test, evaluate, and monitor interventions. Approaches also vary in where they incorporate iteration as part of the design process and how mindful they are of power and ethics throughout an intervention's design.

Behavior Change Approach Best Practices

No single approach is perfect across all criteria; instead, each presents unique strengths and weaknesses that we can utilize and learn from. When choosing a behavior change approach, whether one of the six we selected or an amalgamation of several, we recommend designers aim to maximize each of these criteria by looking for the following best practices:

Variety and strength of behavioral principles

Behavioral principles serve as the behavioral and social science framework through which designers understand and analyze the motivations and barriers that their target actors have relative to behavior change. They also help to design effective interventions. There is no 'right' framework for this, but some approaches have frameworks that are more holistic, evidence-based, and better able to categorize and understand the insights designers gather about the target actor. Look for behavioral principles that can account for internal and external, personal and social, and effortful and unconscious reasons for change. Some behavior change approaches make no explicit mention of strategies like providing information, material incentives, or enacting rules. Instead, these approaches either ignore those strategies altogether or see them as needing to be paired with something like social norms messaging or choice architecture. The risk here is that effecting behavior change can be as simple as providing an incentive, but it can also require a complex combination of different strategies. Ultimately, what is most important is that the strategy designers choose is informed by the data they have collected about their target actors, the target behavior, and actors' position in the relevant socio-ecological context.

Comprehensiveness of design steps

The design steps of a behavior change approach provide implementers and designers with a logical sequence of steps to design a behavior change solution. There is no 'right' set of steps. Even so, we find that most approaches share in a number of core steps that ensure designers are effective. Firstly, designers need to develop an understanding of the socio-ecological context in which current and target behaviors take place. This also means identifying systems, institutions, structural barriers, and enabling factors that may affect the intervention's capacity for behavior change. Secondly, designers need to identify the stakeholders, target actors, and target behavior(s) related to the behavioral outcome they want to achieve. This can also be revised after the third step, which involves qualitative and/or quantitative research on the target behavior and target actor, usually via the tools of social sciences (e.g., ethnographic analysis, surveys, participant observation, etc.). After collecting data, the fourth step involves analyzing data with a behavioral lens. Specifically, designers need to identify the key motivations and barriers driving the actors' behaviors and the behavioral strategies most likely to encourage change. This also requires acknowledging the socio-ecological system from the first step and incorporating any relevant insights that could affect an actor's ability to change. In this step, designers may also develop a psycho-social theory of change (PS-ToC) to guide their intervention.

Design steps now shift from collecting and analyzing data to prototyping and testing an intervention. Testing and revising the intervention multiple times provides valuable insights about whether the intervention is working and what designers could do to improve it before taking it to scale. This may involve another round of quantitative and/or qualitative research, letting designers fill the gaps in their understanding of what will change behavior. Once designers are confident that their intervention is effective in its test phase, they can move to implement it at scale and assess and monitor the results. This involves having a rigorous evaluation strategy that assesses the true impact of the intervention relative to a counterfactual: in other words, a representation of what would have happened if no intervention had taken place. It is also important that designers' design journey not stop there; they should continue to monitor how the intervention may need to adapt and how the target behavior changes over time. An overview of all design steps appears in the figure below.

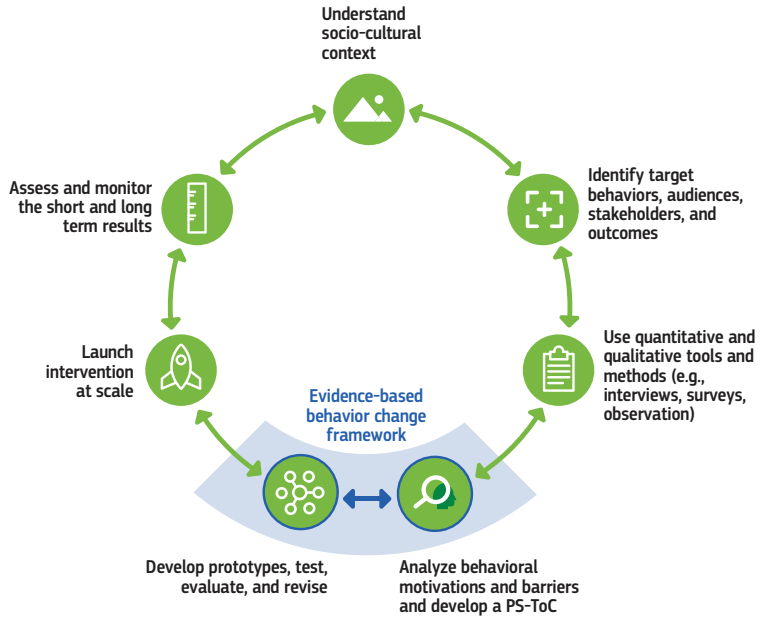


Figure 1: An overview of design steps for behavior change interventions

Consideration of behavior change durability and evaluation

Many behavior change interventions are designed to work for a specific time. We cannot assume that these changes will be durable during or beyond the intervention period when there is no formal monitoring and evaluation strategy. It is important to identify that the intervention is the reason behind a change in behavior and to know that this change will persist. There is, however, a systematic and consistent gap in behavior change approaches relative to how they assess the ongoing impacts of interventions. Additionally, some behavioral design approaches focus heavily on the intervention design, yet do not spend adequate resources on developing an evaluation framework. In cases where rigorous assessment is feasible, it is important to invest time and energy in this framework as a way to measure the effectiveness of the solution and its ability to scale. This means that designers should identify their key indicators and outcomes, determine how they will measure those indicators, and then decide how they will evaluate changes to those indicators. See Part III: Behavior Change Indicators for further recommendations and details for building a robust evaluation framework into the design process.

Ability to work among diverse actors and scales of governance

A general behavior change approach should be applicable to any behavior change problem, regardless of the actors or scale involved. Yes, some actors may be harder to access for various reasons (e.g., government officials, remote communities), but that does not mean that they should not be considered in intervention design. Moreover, effective behavior change interventions tend to involve actors beyond the direct actor. A behavior change approach should be able to plan for and accommodate the roles that other stakeholders may play as part of a given solution.

Working on behavior change at larger scales can be tricky; there are usually more stakeholders involved and contextual factors to consider. Yet, designers should also be able to reapply the same steps they used above to extend their intervention past a narrow set of actors. Addressing systems-level change with a behavioral lens involves working on the system piece by piece, where each is its own behavioral problem.

Integration of understanding the socio-ecological context

An understanding of the socio-ecological context in which a behavior occurs is essential information for the design of any behavior change intervention. A behavior change approach should dedicate adequate time to mapping out

the systems surrounding a behavior. It is likely that these systems will have a significant impact on the intervention options available, whether behavior change is feasible, and if so, for whom. Questions such as 'Which behaviors are related to my environmental outcomes?', 'What is the network of actors connected to these behaviors?', and 'Where do I have the most impact and ability to make change?' are important starting points. Goddard et al.'s (2016) values, rules, and knowledge framework is one way to capture and understand the systemic barriers, institutions, and principles that create the context for behavior change. In understanding this broader context, designers learn about the options that are available to different actors, about who carries decision-making power, and about the behaviors that could reinforce or challenge existing power structures.

Oftentimes behavioral designers are not embedded or a part of the context in which they wish to make change; as a result, they bring a number of information gaps and assumptions into their work. Self-aware designers benefit from noting upfront any personal assumptions before they take the time to understand the behavior and context. Another solution is for designers to co-design with the stakeholders of the behavioral problem to ensure they have an informed perspective at each step of the process. With or without these stakeholders, designers should strive to gain a deep understanding of the behavioral problem at hand before generating any solutions.

Emphasis for design steps to be non-linear, adaptive, and iterative

A good behavior change approach should have the flexibility to be iterative and repeat steps as needed. It is extremely unlikely that designers will get everything 'right' with their first intervention idea. Building in the expectation and time to learn more, make revisions, and complete multiple rounds of testing increases the likelihood that designers will meet their behavior change goals. A stepwise process is important, but designers should not feel as if it is restrictive and linear. They should be able to stop, go back, and repeat steps throughout the process. They may even choose to return to the first step after implementing and assessing their intervention in a series of full- or half-cycles, as exemplified by the World Bank's approach.

Consideration of ethics and power in designing for behavior change

Any behavior change approach should strive to maintain individual rights and help people to pursue their own behavior change goals. In the design steps, a behavior change approach can encourage designers to reflect on every decision they make: for example, what it means to focus on specific behaviors and actors in a given context, who benefits, and who could be negatively impacted in intended or unintended ways. It also means acknowledging and addressing the biases that exist within designers as well as those reinforced by the dynamics of actors in the behavioral system. Environmental designers often come with their own (often academic) backgrounds and perspectives that are different from the local expertise of their target actors. The more time designers take to learn about their target behaviors through the lens of their target actors, or co-design solutions with local stakeholders, the more opportunity there is to shift the power imbalances in intervention design. The OECD's approach offers a checklist at each step of the design process to help assess the ethical considerations of an intervention. The World Bank also conducted research on its own staff to better understand the biases of development designers.

Any behavior change approach should further be mindful of ethics and power in its use of behavioral principles. Research on behavioral economics, choice architecture, and 'nudging' has gotten a lot of attention and criticism from scientists and the public. These tools can be powerful and have indeed demonstrated major impacts on a wide range of topics. Nevertheless, it is important to recognize that these are just one part of a behavior change toolkit. It is very unlikely that a singular strategy would serve as the 'silver bullet' to any one behavior change problem. Unfortunately, some nudging or choice architecture interventions have been described as universally applicable strategies—a perspective that can have disempowering results for many target actors. No matter the strategy, behavior change interventions that use forms of coercion and manipulation create an innate power imbalance and should be avoided. A behavior change approach that aims for real, fair, and durable environmental change should leverage the target actor's own insights in intervention design.

Review of Selected Behavior Change Approaches

In this section, we describe six different behavior change approaches applicable to the environmental field and analyze their strengths and weaknesses relative the evaluation criteria mentioned above.

The Behavioral Insights Team: MINDSPACE, EAST, TESTS

Background

The Behavioral Insights team created MINDSPACE in 2010—simplifying it to EAST in 2012 (Dolan et al., 2010; The Behavioural Insights Team, 2012). These approaches were initially designed to guide policy-makers and government officials into leveraging behavioral theory. They have since expanded and now also cater to NGOs and private firms.

Behavioral principles

MINDSPACE and EAST are acronyms for behavioral principles and strategies used in the design of behavioral interventions:

MINDSPACE

- Messenger: We are heavily influenced by who communicates information
- Incentives: Our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses
- Norms: We are strongly influenced by what others do
- Defaults: We "go with the flow" of pre-set options
- Salience: Our attention is drawn to what is novel and seems relevant to us
- Priming: Our acts are often influenced by sub-conscious cues
- Affect: Our emotional associations can powerfully shape our actions
- Commitments: We seek to be consistent with our public promises, and reciprocate acts
- Ego: We act in ways that make us feel better about ourselves

EAST

- Easy: Harness the power of defaults; Reduce the 'hassle factor' of taking up a service; Simplify messages
- Attractive: Attract attention, Design rewards and sanctions for maximum effect
- Social: Show that most people perform the target behavior; Use the power of networks; Encourage people to make a commitment to others
- Timely: Prompt people when they are likely to be most receptive; Consider the immediate costs and benefits; Help people plan their response to events

Design steps

The Behavioral Insights Team uses a methodology with the acronym TESTS, and the steps are defined in the graphic below (Green et al., 2019):

Source: (Green et al., 2019)

Environmental applications in GEF focal areas

- Reviews by Palm-Forster et al. (2019) and Shreedhar (2020) summarize behavioral interventions applied to agri-environmental and conservation contexts (developed in the academic literature) according to the MINDSPACE framework.
- **Wildlife Conservation:** The aim of the project was to encourage volunteers to take a more active role in the local government's 'Eco Village' program (The Behavioral Insights Team, 2019).
- **Chemicals and Waste Management:** The research introduced two different initiatives to encourage the use of reusable lunch containers and reduce single-use plastic (The Behavioral Insights Team, 2020).
- **Climate Change Mitigation and Adaptation:** This study involved distributing a new thermostat that makes energy saving attractive by nudging consumers to "collect green leaves" (The Behavioral Insights Team, 2017).

Strengths & weaknesses

- **Variety and strength of behavioral principles:** Both MINDSPACE and EAST simplify a variety of behavioral principles into memorable mnemonic devices. The frameworks do not include more standard or traditional strategies such as enacting laws or providing information.
- **Comprehensiveness of design steps:** The TESTS approach has a comprehensive set of steps, ranging from defining the problem and its possible outcomes, to evaluating and scaling the possible solution(s).
- **Consideration of behavior change durability and evaluation:** MINDSPACE and EAST both describe how certain strategies are more durable than others, such as providing reminders (less durable) vs. establishing social norms (more durable). TESTS also includes explicit guidance for testing and evaluating interventions yet offers less on monitoring outcomes over time.
- **Ability to work among diverse actors and scales of governance:** The Behavioral Insights team was founded

with the aim of incorporating behavioral insights into bureaucratic processes, public service, communications, and policy. Since its founding, their scope of work has broadened to include NGOs and private firms. Their projects show good representation of actors and outcomes at the household, organization, and government level.

- ○ **Incorporates socio-ecological contextual analysis:** TESTS emphasizes the importance of understanding the context in which a behavior takes place as well as the larger systems that shape it. Still, it does not provide tools or guidance for how to analyze these systems, or about how to establish checks so that such an analysis appears in solution design.
- ● **Emphasis for design steps to be non-linear, adaptive, and iterative:** TESTS explicitly mentions how the steps of the process are non-linear and involve iteration and feedback loops.
- ○ **Consideration of ethics and power:** This framework considers the role of designers as well as how different actors may have the agency to change their behavior. It does not provide concrete recommendations for addressing the bias of intervention designers, nor the many ways that power asymmetries may influence the various steps of the design process.

For more information on the Behavioral Insights Team's approach, explore the following resources:

Dolan, P., Hallsworth, M., Halpern, D., King, D., & Vlaev, I. (2010). *MINDSPACE: Influencing behaviour for public policy* [Monograph]. Institute of Government. http://www.instituteforgovernment.org.uk/publications/

Green, K., Williamson, K., Park, T., & Reiner, C. (2019). Behavior Change for Nature: A Behavioral Science Toolkit for Practitioners. Rare. https://behavior.rare.org/wp-content/uploads/2019/10/2019-Behavior-Change-for-Nature-Report-digital.pdf

The Behavioural Insights Team. (2012). EAST: Four simple ways to apply behavioural insights. https://www.bi.team/wp-content/uploads/2015/07/BIT-Publication-EAST_FA_WEB.pdf

COM-B and The Behavior Change Wheel

Background

Michie et al. (2011) developed a set of guidelines for designing behavior change interventions based on a review of 19 frameworks and 7 policy categories. The COM-B model describes a person's physical and psychological capability (C), physical and social opportunity (O), and automatic and reflective motivation (M) as the core causes of behavior (B) at any given moment. The Behavior Change Wheel presents the COM-B model as the center circle and concentric circles of intervention functions (or behavioral principles/strategies) and policy categories.

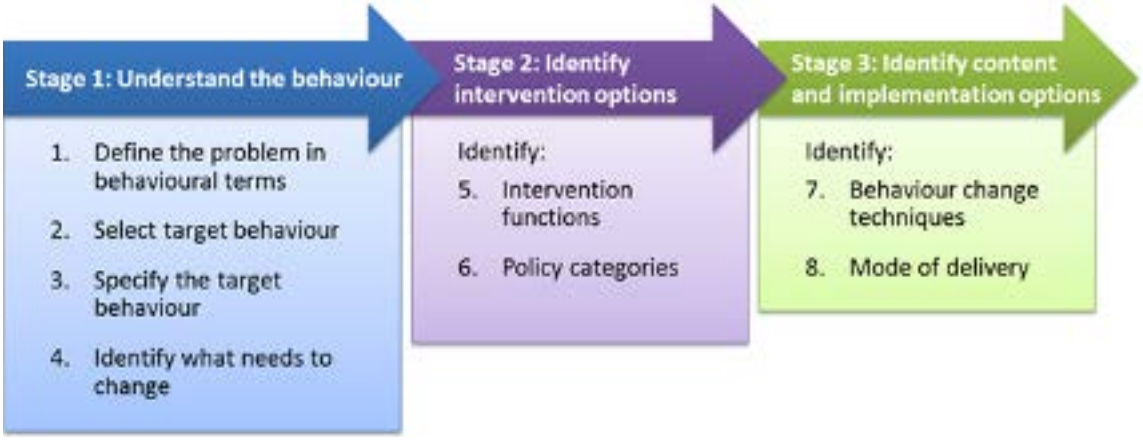
Behavioral principles

The intervention functions in COM-B and the behavior change wheel serve as the behavioral principles or strategies employed in this approach:

- Persuasion: Using communication to induce positive or negative feelings, or to stimulate action
- Education: Increasing knowledge or understanding
- Restrictions: Using rules to reduce the opportunity to engage in the target behavior (or to increase the likelihood of engaging in the target behavior by reducing the opportunity to engage in competing ones)
- Environmental restructuring: Changing the physical or social context
- Modeling: Providing an example for people to aspire to or imitate
- Enablement: Increasing means/reducing barriers to increase capability or opportunity
- Training: Imparting skills
- Coercion: Creating an expectation of punishment or cost
- Incentivization: Creating an expectation of reward

Design steps

COM-B and the Behavior Change Wheel approach use the following steps over three stages for designing interventions (Michie et al., 2014):



Source: Michie, S., Atkins, L., & West, R. (2014)

Environmental applications in GEF focal areas:

- **Wildlife Conservation:** The COM-B framework was used in a review to analyze the potential routes to encourage higher welfare food choices to increase the well-being of farm animals (Cornish et al., 2019).
- **Chemicals and Waste Management:** The COM-B framework guided qualitative research that aimed to develop behavioral interventions to encourage recycling behaviors (Gainforth et al., 2016). These interventions are yet to be tested.
- **Climate Change Mitigation and Adaptation:** The framework was used to guide a game design that aimed to encourage energy conservation (Wells et al., 2016).
- **Land Degradation:** The COM-B framework was applied to reveal factors that facilitate and impede the adoption of sustainable farming in the face of the threat of invasive species in Austria (Kropf et al., 2020).

Strengths & Weaknesses

- ● **Variety and strength of behavioral principles:** This approach covers the full range of strategies, including more traditional ones like rules and regulations, information, incentives, in addition to emotional, social, and environmental types of motivations.
- ○ **Comprehensiveness of design steps:** The design steps focus heavily on understanding context and designing appropriate solutions. While the delivery of interventions is also emphasized, there is less explicit detail on testing, launching, or evaluating interventions.
- ○ **Consideration of behavior change durability and evaluation:** This approach describes the importance of rigorous evaluation and measuring change over time but does not include explicit guidance about how to do these steps.
- ● **Ability to work among diverse actors and scales of governance:** This approach is explicit that it was designed to work across local, regional, and national scales as well as with different sets of actors (ranging from single individuals to entire communities). It is highly sensitive to the scale of intervention needed, especially within the way it defines different policy categories.
- ○ **Incorporates socio-ecological contextual analysis:** This approach is strong in its contextual analysis and in the way it sees any behavior as part of a greater system of actors and structures. Still, it lacks an explicit focus on socio-ecological barriers, focusing more on physical or cognitive barriers to change.
- ○ **Emphasis for design steps to be non-linear, adaptive, and iterative:** This approach is flexible for making revisions to one's design but is not explicitly non-linear or iterative.
- ● **Consideration of ethics and power:** This approach takes great care in understanding the social context (e.g., actors and system) in which a behavior operates and includes criteria for assessing the acceptability, side effects, safety, and equity of an intervention.

For more information on the Behavior Change Wheel approach, explore the following resources:

Michie, S., Atkins, L., & West, R. (2014). *The Behaviour Change Wheel: A Guide to Designing Interventions.* Silverback Publishing.

Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science:* IS, 6, 42. https://doi.org/10.1186/1748-5908-6-42

OECD: BASIC

Background

The OECD created the BASIC toolkit in 2019 for policymakers that includes tools, methods, and guidelines for designing behavioral interventions at all stages in a policy cycle (OECD, 2019).

Behavioral principles

This approach uses the following 'ABCD' principles to guide interventions:

- Attention: People's attention is limited and easily distracted
- Belief formation: People rely on mental shortcuts and often over/underestimate outcomes and probabilities
- Choice: People are influenced by the framing of choices as well as their social and situational context
- Determination: People's willpower is limited and subject to psychological biases

Design steps

The acronym, BASIC, is a way to remember the steps in the OECD's behavioral design process:

1. Behavior: Identify and target the crucial behavioral aspects of the policy problem.
2. Analysis: Scrutinize target behaviors through the lens of behavioral science.
3. Strategy: Identify and conceptualize behaviorally informed policy solutions.
4. Intervention: Design experiments to evaluate the effectiveness of the strategies.
5. Change: Plan for implementation, scale, monitoring, evaluation, maintenance, and dissemination of results.

Source: OECD (2019)

Environmental applications in GEF focal areas

Not yet available due to this approach having been developed only in the last year.

Strengths & weaknesses

- **Variety and strength of behavioral principles:** ABCD is a helpful acronym, yet it is a limited framework for categorizing behavioral motivations and barriers. It both does not cover strategies such as incentives and information, and some of the principles appear to be overlapping.
- **Comprehensiveness of design steps:** This approach explicitly covers all of the important steps in the design process, from identifying behaviors and outcomes, to implementation, to the evaluation of results. Still, the step on collecting data on motivations and barriers lacks detail. This approach jumps from identifying a behavior and its context, to analyzing motivations and barriers.

- **Consideration of behavior change durability and evaluation:** The toolkit specifically mentions the importance of measuring, evaluating, and sharing the impacts of an intervention.
- **Ability to work among diverse actors and scales of governance:** Designed for the policy sector, this approach is flexible and functions at scales that range from households to governments.
- **Incorporates socio-ecological contextual analysis:** The authors emphasize the need to understand the context of a behavior as well as engaging those stakeholders that are related to it. This is done to better understand the system in which the behavior operates. The authors also offer system mapping tools, but those focus mainly on actors and behaviors, not on socio-ecological factors. Due to this approach's emphasis on ethics, designers are further prompted to consider feasibility and the structural barriers that could impede their options.
- **Emphasis for design steps to be non-linear, adaptive, and iterative:** The process is iterative and offers the ability to refine outcomes and solutions while gathering more information.
- **Consideration of ethics and power:** This framework uniquely prioritizes ethical considerations at each phase of the design process.

For more information on the OECD approach, explore the following resource:

OECD. (2017). *Behavioural Insights and Public Policy: Lessons from Around the World.* OECD Publishing. https://www.oecd-ilibrary.org/governance/behavioural-insights-and-public-policy_9789264270480-en

Rare: Behavior-Centered Design and Levers of Behavior Change

Background

Rare's Center for Behavior & the Environment developed both a behavior change framework and an approach for environmental designers based on lessons learned during their many years of behavior change work in conservation (Green et al., 2019; Rare, 2020).

Behavioral Principles

Rare uses six levers of behavior change that can be pulled individually or in combination to achieve different effects when designing interventions:

- Emotional Appeals: Using emotional messages to drive behavior
- Social Influences: Leveraging the behaviors, beliefs, and expectations of others
- Choice Architecture: Changing the context in which choices are made
- Rules and Regulations: Enacting rules that promote or restrict a behavior
- Material Incentives: Increasing or decreasing real or perceived costs, time, or effort for doing a behavior
- Information: Providing information about what the target behavior is, why it matters, and how to do it

Design steps

Rare's design approach is called Behavior-Centered Design and uses the following steps:

- Frame: Frame the conservation challenge to understand the target behavior, target actor, and describe their context.
- Empathize: Gain deep insights into the target actor's relationship with the target behavior, including the motivations and challenges they face.
- Map: Organize insights about your target actor into behavioral motivations and challenges.
- Ideate: Generate, group, and prioritize intervention ideas.
- Prototype: Select your best intervention idea and develop a prototype (small-scale version) that captures its essential features.
- Test: Test your prototype with your target actor and make revisions based on their feedback and your own experience.
- Launch: Plan and launch your full-scale intervention and think about evaluation and impact metrics.
- Assess: Assess the impact of your intervention and reflect on potential improvements.

Source: Green et al. (2019)

Environmental applications in GEF focal areas:

- **Biodiversity conservation:** Fishers were given a tool to measure the size of lobsters easily (to prevent them from fishing small lobsters) and a communication campaign 'The Size Matters' to educate fishers about sustainable fishing methods (Green et al., 2019).
- **Biodiversity conservation:** Rare developed a Theory of Cooperative Behavior Adoption that provides guidance for addressing common-pool resource dilemmas in the environmental field, including water and land management, and draws upon the BCD approach and behavior levers framework (Thulin, 2020). Rare's Fish Forever program also uses this theory to design community-based interventions.
- **Land management:** Rare launched a social marketing campaign in Mexico to join a Payments for Ecosystem Services program and conserve forest habitat (Green et al., 2013)
- **Water management:** Rare's watershed program in the Andes region facilitated communication and cooperation between upstream and downstream users to ensure clean water for everyone (Rodríguez-Dowdell et al., 2014).

Strengths & weaknesses

- **Variety and strength of behavioral principles:** The levers of behavior change cover common and traditional strategies, like information and incentives, as well as the latest findings in behavioral insights for emotional, social, and choice architecture-based motivations.
- **Comprehensiveness of design steps:** The approach considers a full range of steps from identifying the problem to evaluating interventions in its intervention design process
- **Consideration of behavior change durability and evaluation:** This approach helps designers evaluate their interventions but offers less guidance on assessing durability or on the monitoring of interventions over time.
- **Ability to work among diverse actors and scales of governance:** This approach has mostly been used to design interventions for households and communities, yet it can easily be applied to more diverse sets of actors and scales (whether local, regional, or national).
- **Incorporates socio-ecological contextual analysis:** This approach encourages designers to analyze the broader context of behavioral outcomes (particularly as they relate to sustainable behavior change) yet does not have specific tools for building socio-ecological variables into solution design.
- **Emphasis for design steps to be non-linear, adaptive, and iterative:** This approach clearly emphasizes the importance of revising solutions over many iterations.

- **Consideration of ethics and power:** This approach considers the kinds of biases that designers bring to their work, the broader systems in which behaviors occur, as well as how to best involve target actors meaningfully during solution design. Yet, it is less clear how these considerations fit into every stage of the design process.

For more information on Rare's approach, explore the following resources:

Green, K., Williamson, K., Park, T., & Reiner, C. (2019). *Behavior Change for Nature: A Behavioral Science Toolkit for Practitioners.* Rare. https://behavior.rare.org/wp-content/uploads/2019/10/2019-Behavior-Change-for-Nature-Report-digital.pdf

Rare. (2020). Behavior Change for the Environment – Rare. https://behavior.rare.org

World Bank: Mind, Society, and Behavior

Background

The World Bank aimed to develop a toolkit that describes the latest findings in behavioral science so that researchers and designers in the development field have a systematic and accessible approach to use (World Bank, 2014).

Behavioral principles

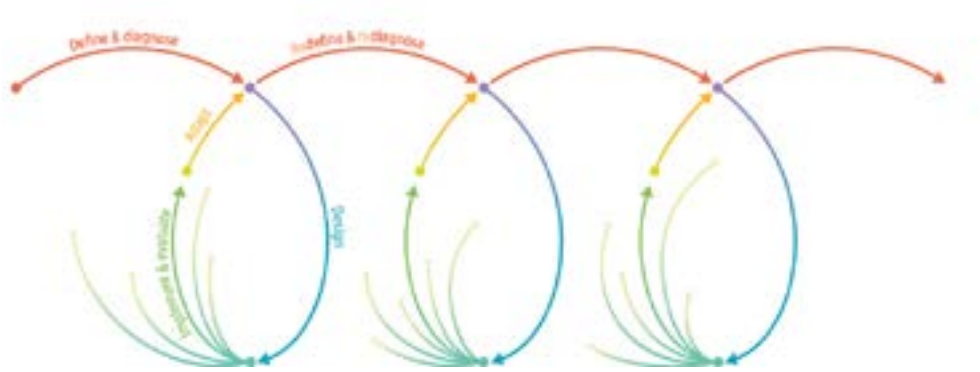
The World Bank's framework applies these three main principles:

- Thinking automatically: Much of our thinking is automatic, not deliberative. It is based on what effortlessly comes to mind.
- Thinking Socially: Humans are not autonomous thinkers or decision-makers, and we are deeply social animals. We have innate preferences for altruism, cooperation, and reciprocity, and we are strongly affected by the social norms and networks in our communities.
- Thinking with mental models: Individuals respond not to objective experiences but to mental representations of experience constructed from culturally-available mental models. Human decision making, therefore, is shaped by the powerful pull of both contextual cues and the past experiences of individuals and societies.

Design steps

This design approach can be described in these stages that repeat in cycles. They also emphasize investing more resources in the first half of the process:

- Define and Diagnose: Describe the behavior and the problem
- Design: Design an intervention that incorporates insights about the behavior and obstacles to it
- Implement & Evaluate: Experimenting with and testing different solutions to see what works
- Adapt: Revise solutions and re-define and re-diagnose the behavior



Source: World Bank (2014)

Environmental applications in GEF focal areas

- **Chemicals and Waste Management:** Behaviorally designed letters providing information on recycling and waste collection were delivered to 4,800 households and small businesses from the city of Trelew, in the Argentinean Patagonia (The Mind, Behavior, and Development Unit, 2019).
- **Land management and climate adaptation:** Examining the socio-ecological context of women's participation in forest conservation programs in Mexico (Walk a Mile in Her Shoes: eMBeD Brief, 2018).

Strengths & weaknesses

- ○ **Variety and strength of behavioral principles:** While the behavioral principles cover a range of insights, they do not cover more traditional strategies like information or incentives. It is also hard to distinguish how different strategies may be categorized.
- ○ **Comprehensiveness of design steps:** The steps of this design process are generally strong, although it blends steps involving definition and diagnosis as well as implementation and evaluation. This reduces the amount of detail about the important actions to take for each of the above points.
- ○ **Consideration of behavior change durability and evaluation:** This approach does not explicitly comment on the long-term durability of outcomes; however, it explicitly states that some interventions failed to produce long-term change. This provides some degree of perspective on the effectiveness of behavioral strategies.
- ● **Ability to work among diverse actors and scales of governance:** As an approach designed for the development context, it applies to a range of actors on a local, regional, and national scales.
- ○ **Incorporates socio-ecological contextual analysis:** This approach emphasizes the importance of understanding the target actor's context as well as the social and structural obstacles they may face. It does not, however, provide a step-by-step guide or tools for understanding the greater system in which a behavior operates prior to exploring motivations and barriers.
- ● **Emphasis for design steps to be non-linear, adaptive, and iterative:** This approach has a strong emphasis on iterative and non-linear design, reminding designers to incorporate feedback from testing into future designs.
- ● **Consideration of ethics and power:** This approach specifically draws attention to the ways development designers make biased assumptions and how to acknowledge and address those when attempting to change behavior. It also describes the importance of understanding sensitive topics when doing research, and to be mindful of power dynamics in different contexts.

For more information on the World Bank's approach, explore the following resource:

World Bank. (2014). *World Development Report 2015: Mind, Society, and Behavior*. The World Bank. https://doi.org/10.1596/978-1-4648-0342-0

Ideas42

Background

Ideas42 is a non-profit innovation firm that applies behavioral science for social impact. They have developed a standard approach and behavior change framework they use in all of their projects (Ideas42, n.d.).

Behavioral principles

- Choice overload: When faced with a huge range of options, many people fail to choose the best option or fail to choose altogether. Having more options often leads to less realized choices.
- Cognitive depletion & decision fatigue: Being tired and hungry can deplete our cognitive resources and significantly affect our decision-making.
- Hassle factors: Sometimes we do not act in accordance with our intentions because of seemingly minor inconveniences.
- Identity: Many of our choices are impacted by the perception we have of ourselves and our social roles.
- Limited attention: Our ability to pay attention to several things at once is much more limited than we might think.
- Loss aversion: People hate losses more than they love wins.
- Primacy bias: The bias toward the information that is presented first.
- Procrastination: We put off for tomorrow what we could (and often should) do today.
- Social norms: All of us are heavily influenced by our perception of what others are doing.
- Status quo bias: People prefer to stick with the status quo, even if other options are available.
- The availability heuristic: People judge probabilities based on how easily examples come to mind.
- The planning fallacy: People tend to be overly optimistic about their ability to finish tasks on time. They consistently believe the future will unfold as planned, and they rarely leave sufficient time to meet key deadlines.

Design steps (Tantia, 2017):

- Define: Identify the problem and intended outcome
- Diagnose: Hypothesize barriers to target behaviors relevant to your strategy
- Design: Develop strategies to address behavioral barriers
- Test: Testing your designed intervention through prototyping.
- Scale: Take your solution to scale.

Source: Datta, S., & Mullainathan, S. (2014)

Environmental applications in GEF focal areas:

- **Chemicals and Waste Management:** Before the tax went into effect, 82% of consumers shopping in sample stores in Chicago used at least one disposable bag per trip. Over the next year, the bag tax led to a decrease of 27.7 percentage points in the likelihood of using any disposable bags, despite the incentive being negligible (Homonoff et al., 2018).
- **Climate Change Mitigation and Adaptation:** Encouraging water conservation in Costa Rica: Two interventions—adding colored stickers focused on social comparison to utility bills and goal-setting postcards—each reduced water consumption by up to 5.6% (Datta et al., 2019).
- **Land Degradation:** Seaweed farmers learned to optimize growing practices when presented with summaries of results of experimental plots, with key dimensions highlighted (Faulstich-Hon et al., 2019).

Strengths & weaknesses

○ **Variety and strength of behavioral principles:** The principles that Ideas42 describes on their website exemplify the ones they use in their work. These cover a range of specific behavioral insights, but they are not exhaustive in terms of all of the motivations and barriers to behavior (for example, they exclude incentives and information).

● **Comprehensiveness of design steps:** This approach includes a comprehensive and simple set of design steps ranging from identifying the problem to launching and scaling interventions.

○ **Consideration of behavior change durability and evaluation:** The approach explicitly mentions different ways to test and evaluate effective solutions yet does not include any detail on monitoring over the long term.

● **Ability to work among diverse actors and scales of governance:** This approach has been applied in a variety of social impact contexts and among different actors at local, regional, and national scales.

○ **Incorporates socio-ecological contextual analysis:** This approach emphasizes the importance of broader context—structural, economic, social, or psychological—for the successful development of interventions, yet does not offer explicit guidance for how to incorporate these insights. Ideas42 also has an Act to Adapt toolkit that specifies how different types of decisions (e.g., contextual, expert, political, structural) shape how an intervention is designed.

- **Emphasis for design steps to be non-linear, adaptive, and iterative:** This approach clearly describes the importance of iteration and feedback between the steps in its process.
- **Consideration of ethics and power:** This approach seeks to empower stakeholders and actors in their behavior change goals yet does not explicitly describe ways to mitigate power dynamics in each stage of the design process.

For more information on Idea42's approach, explore the following resources:

Ideas42. (n.d.). Ideas42. Retrieved June 17, 2020, from https://www.ideas42.org

Tantia, P. (2017). The New Science of Designing for Humans. Stanford Social Innovation Review. https://ssir.org/articles/entry/the_new_science_of_designing_for_humans

Appendix A: Complete List of Reviewed Organizations and Their Behavior Change Approaches

#	Organization/Authors	Approach/Tool Name
1	Behavioral Insights Team (Dolan et al., 2010)	MINDSPACE
2	Michie et al. (2011)	COM-B model, Behavior change wheel
3	Organization for Economic Co-operation and Development (OECD)	The Basic Toolkit for applied behavioral insights
4	Behavioral Insights Team	EAST
5	Ostrom (2007, 2009), Poteete et al. (2010)	Socio-ecological systems frame-work (SESF)
6	Rare's Center for Behavior and The Environment	Behavior change levers
7	European Union	Behavioral Insights applied to policy
8	eMBeD World Bank	Mind, Society and Behavior Report
9	United Nations (including UNEP)	Behavioral Insights 101
10	Ideas42	Ideas42 Principles
11	Consultative Group on International Agricultural Research (CGIAR)	Behavior change guide
12	National Oceanic and Atmospheric Administration (NOAA)	Risk Behavior and Communication: Best Practices
13	TRAFFIC	Persuasion toolkit to decrease the demand for illegal wildlife
14	Behavioral Science and Policy Association	Toolkit to strengthen the energy and environmental policy
15	Nordic council of ministers report	Nudging Pro-environmental Behavior
16	Behavioral Economics insights	Behavioral Economics Guide
17	Public health England	Toolkit for behavioral change for Weight management
18	Behavior Centered Design	BCD and Theory of Change
19	Behavioral Economics in Action at Rotman	A Practitioner's guide to nudging
20	Internal Revenue Service	Behavioral Insights Toolkit
21	Illinois Institute of Design	Brains, Behavior and Design toolkit
22	Common Cause Values Report	Framing Conservation
23	MDRC	SIMPLER
24	Bridgeable	A Guide to Using Behavioral Economics with Service Design
25	UNICEF	Demand for Health Services Field Guide
26	Unilever	Five levers of change for sustainable consumption
27	North American Association for Environmental Education	Influencing Conservation Action
28	World Wildlife Fund	Psychosocial Approach to Communication
29	Public Interest Research Centre	Framing nature toolkit
30	The University of Manchester	Change Points: A toolkit for designing interventions that unlock unsustainable practices

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Glossary

Actors: People whose behavior directly or indirectly affects program outcomes

Adaptive management: a process of updating and improving how a program is managed based on data and feedback about what is working or not working

Attitude: An evaluation of something, ranging from negative to positive

Barriers: Forces, attitudes, beliefs, or other reasons that prevent someone from doing a behavior

Behavior: An action that a person takes in response to something (a stimuli)

Behavior-actor pair: A grouping that identifies a behavior and who is doing it

Behavioral insights: The findings that result from analyzing patterns in how people tend to behave.

Behavioral system: A network of actors, mapping how each actor's behavior influences each other's capacity to act and their interest in doing so

Behavior change approach: A methodology for changing behavior, often drawing upon principles of behavioral design

Behavioral indicator: A measurement that signifies behavior (or something that approximates it) has changed

Behavior change intervention, programming: A set or sequence of activities that aim to influence actors to adopt target behaviors to achieve a certain outcome

Behavioral design: An approach that blends insights from the design and behavioral and social science fields

Belief: Something that someone accepts to be true

Bias/Cognitive bias: A way of thinking that systematically deviates from rational choice

Control: A level of an independent variable a person or group is assigned to in a study that receives no additional intervention

Counterfactual: A comparison for an intervention to assess its impact that shows what would have happened if no intervention had taken place

Cross-context generalizability: The degree to which something applies to other socio-ecological contexts

Design thinking: A creative and iterative process for developing, designing, and testing innovative solutions, often used in combination with human-centered design

Difference-in-difference: A quasi-experimental method that compares the pre-post change (difference) in outcomes for the treatment group with the change in outcomes of a comparison group

Direct observation: Type of behavior measurement based on directly observing behavior, rather than using a proxy or self-report measurement

Disaggregation: A data reporting process that shows how an intervention may have impacted different groups differently

Doer/non-doer analysis: A comparison of the motivations and barriers for people who are already doing the target behavior and those not doing the target behavior

Durability: The degree to which an intervention's effects persist during an intervention period and after the intervention has ended

Dynamic programming: Making live programmatic decisions about phase transitions, expansion, or termination based on real-time monitoring of psychological and social states of the target actors

Human-centered design: An approach or mindset to problem-solving that centers people's needs and goals in solution designs, often combined with design thinking

Matching: A quasi-experimental method that builds a comparison group by identifying units that are similar to each of the treatment units based on a relative set of observable characteristics

Motivations: Forces, attitudes, beliefs, or other reasons that encourage someone to do a behavior

Outcomes: The behavioral, social, or other goals or objectives a program is trying to achieve

Outputs: The components of a program that help to show how it achieved its outcomes and may serve as intermediary objectives

Pre-post comparison: A study where a treatment effect is estimated by subtracting the base-line value from the value after treatment

Program activities: The parts of an intervention that are implemented to change behavior, such as training sessions, pledges, incentive mechanisms, etc.

Prototype: A small-scale version of a behavioral solution that captures its essential features and can be tested with target actors

Proxy measures: Type of behavior measurement that uses outcomes assumed to be tightly related to the target behavior

Psychological indicator: A measurement that signifies a belief, attitude, or preference (or something that approximates it) has changed

Psycho-social state: Beliefs, values, expectations, and social relations that result from program activities, and other psycho-social states and also influence future behavior

Psycho-social theory of change: A theory of change that links intervention components to psychological or social changes, leading to behavioral outputs and environmental and social out-comes

Pulse monitoring: Assessing key psycho-social indicators on a frequent basis throughout pro-gram delivery

Quasi-experimental methods: Evaluation methods that infer the causal effect of an intervention without randomization when assigning individuals to treatment conditions

Randomized evaluations, Randomized Control Trials (RCTs): Evaluation methods where individuals are randomly assigned to treatment conditions

Self-report measures: Type of behavior measurement where the rate or intensity of a behavior is inferred through responses from instruments such as surveys

Social indicator: A measurement that signifies a social state, structure, or factor (or something that approximates it) has changed

Social marketing: The application of techniques from marketing to shift behavior to benefit individuals and society

Socio-ecological system: A system of interdependent linkages between ecological factors, social and cultural factors, and institutions at different scales that continually adapt over time

Stakeholders: Individuals or groups who have an interest in environmental outcomes or will be affected by a project and program

Study condition: A level of an independent variable a person or group is assigned to in a study

Study treatment: The intervention an individual or a group receives, based on the condition to which they were assigned

Systems thinking: An approach that synthesizes how parts of a system relate to, influence, and cause one another, often through feedback loops

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Rare inspires change so people and nature thrive. Conservation ultimately comes down to people – their behaviors toward nature, their beliefs about its value, and their ability to protect it without sacrificing basic life needs. And so, conservationists must become as skilled in social change as in science; as committed to community-based solutions as national and international policymaking.

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