

# **Behavior Wizard: A Method for Matching Target Behaviors with Solutions**

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**Abstract.** We present a method for matching target behaviors with solutions for achieving those behaviors. Called the Behavior Wizard, this method first classifies behavior change targets into one of 15 types. Later stages focus on triggers for the target behaviors and on relevant theories and techniques. This new approach to persuasive design, as well as the terminology we propose, can lead to insights into the patterns of behavior change. The Behavior Wizard can also increase success rates in academic studies and commercial products. The most current version of this method is at [www.BehaviorWizard.org](http://www.BehaviorWizard.org).

**Keywords:** behavior change, persuasive design, habits, captology, behavior models, Fogg Behavior Model, Behavior Grid, Behavior Wizard

## **1. Overview of Behavior Wizard**

In this paper we propose an outcome-based method for classifying research and design related to persuasive technology. We call this method the Behavior Wizard.

The purpose of the Behavior Wizard is to match types of target behaviors with solutions for achieving those target behaviors. In this method the types of behavior are not constrained to a single domain like health or environment. For example, consider a behavior type we call “Black Path.” This behavior type is about stopping an existing behavior permanently. Black Path behaviors include quitting smoking, ending a cursing habit, never using Facebook again, and so on. Even though the examples come from various domains, we propose that the underlying psychology for achieving Black Path behaviors is largely the same. Many people before us have pointed out the importance of matching psychology to target behavior [1][2][3]. However, as a persuasive design community, we have lacked a taxonomy and a terminology that allows precise discussions about different types of target behaviors.

The Behavior Wizard is a systematic way of thinking about behavior change. It is not a specific software application or section of code. In this paper, when we talk about the Behavior Wizard, we refer to a method of identifying specific types of behavior targets and matching those to relevant solutions. More information about this method, as well as the current implementation for public use, can be found at [www.BehaviorWizard.org](http://www.BehaviorWizard.org).

## **2. Background on Classifying Behaviors**

Two major traditions in psychology have influenced our thinking about types of behavior change. In recent decades the most compelling tradition views behaviors from the perspective of control. This includes Bandura's Efficacy Theory (previously Social Cognitive Theory) [4], which locates control inside individuals; Dweck's work in mindset [5], which explores behavior based on a continuum of control; and Ross and Nisbett's Attribution Theory [6], which shows the control that context has over individual behavior.

The second major tradition views behavior change types as part of a sequence. The dominant approach comes from Prochaska and DiClemente who created the Transtheoretical Modal (TTM) (also called the "Stages of Change Model") [7]. First developed for health behavior change, the popular TTM describes six stages. The first three are not behavior types but stages that anticipate behaviors. The last three stages, however, are behavior types called "Action," "Maintenance," and "Termination." Echoes of these behavior types are found in the Behavior Wizard; however, the required sequential nature is not part of our work. Despite TTM's widespread use (or perhaps because of it), this model has been strongly criticized [8][9].

Other sequential models of behavior change emerge from compliance-gaining theories [10], as well as conversion funnel approaches, popularized by consumer Internet strategists [11]. These last approaches to behavior are limited because they apply mostly to one-time actions, not repeated behaviors or cessation of behaviors.

Most recently Fogg proposed 35 ways behavior can change [12]. This early approach had some shortcomings, but it is the basis for our improved method for categorizing behaviors, as well as the starting point for the Behavior Wizard described in this paper.

## **3. The Need to Better Classify Behavior Types**

As persuaders we humans mostly draw on intuition to achieve target behaviors. For example, at the airport we can persuade the desk agent to upgrade our seat on the plane. Then, without much thought, we can switch gears to achieve a different type of behavior, persuading ourselves not to purchase a bag of potato chips before boarding the plane. For most humans, adapting our influence techniques comes naturally.

In the last 15 years, the world has shifted from a local landscape of human persuaders to a larger universe with machines designed to persuade. This shift has made a method like the Behavior Wizard more necessary than before. Computational machines can't (yet) rely on intuition to create persuasive experiences. Creators of persuasive technologies must pre-code the experience. To be most effective, we must think clearly about specific target behaviors and how to achieve each type. Without such an approach, designers are merely guessing.

We believe that fuzzy thinking correlates with failed solutions. The evidence for this may be hard to show scientifically, but a graveyard of failed experiments and commercial products memorialize the challenges of persuasive design. The success rates for future persuasive technologies will depend on a more systematic approach to behavior change. This need has motivated us to create the Behavior Wizard.

The Behavior Wizard proposed in this paper is not perfect, but we believe it is a significant step forward to more precise and systematic thinking about behavior

change. This approach can make us more effective researchers and designers, saving both time and energy. In other words, the Behavior Wizard can help us create successful persuasive technologies.

A matrix of 15 types of behavior change is the foundation for the Behavior Wizard’s first phase. Before explaining this matrix, we think it most helpful to describe a scenario of use for the Behavior Wizard.

**Table 1.** Fogg’s Behavior Grid specifies 15 types of behavior change. The items in italics are sample behaviors, all related to eco-friendly actions.

	<b>Green behavior</b> Do <u>new</u> behavior, one that is <u>unfamiliar</u>	<b>Blue behavior</b> Do <u>familiar</u> behavior	<b>Purple behavior</b> <u>Increase</u> behavior intensity or duration	<b>Gray behavior</b> <u>Decrease</u> behavior intensity or duration	<b>Black behavior</b> <u>Stop</u> doing a behavior
<b>Dot behavior</b> is done <u>one-time</u>	<b>GreenDot</b> Do new behavior one time  <i>Install solar panels on house</i>	<b>BlueDot</b> Do familiar behavior one time  <i>Tell a friend about eco-friendly soap</i>	<b>PurpleDot</b> Increase behavior one time  <i>Plant more trees &amp; local plants today</i>	<b>GrayDot</b> Decrease behavior one time  <i>Buy fewer bottles of water now</i>	<b>BlackDot</b> Stop doing a behavior one time  <i>Turn off space heater for tonight</i>
<b>Span behavior</b> has specific <u>duration</u> , such as 40 days	<b>GreenSpan</b> Do new behavior for a period of time  <i>Carpool to work for three weeks</i>	<b>BlueSpan</b> Do familiar behavior for a period of time  <i>Bike to work for two months</i>	<b>PurpleSpan</b> Increase behavior for a period of time  <i>Take public bus for one month</i>	<b>GraySpan</b> Decrease behavior for a period of time  <i>Take shorter showers this week</i>	<b>BlackSpan</b> Stop a behavior for a period of time  <i>Don’t water lawn during summer</i>
<b>Path behavior</b> is done from now on, a <u>permanent change</u>	<b>GreenPath</b> Do new behavior from now on  <i>Start growing own vegetables</i>	<b>BluePath</b> Do familiar behavior from now on  <i>Turn off lights when leaving room</i>	<b>PurplePath</b> Increase behavior from now on  <i>Purchase more local produce</i>	<b>GrayPath</b> Decrease behavior from now on  <i>Eat less meat from now on</i>	<b>BlackPath</b> Stop a behavior from now on  <i>Never litter again</i>

#### 4. Scenario of Using the Behavior Wizard

An efficient way to show how the Behavior Wizard benefits the persuasive design process is through a scenario. The Behavior Wizard makes the following a reality:

*For her thesis project, Jane will investigate how technology can persuade people to watch less TV. After a period of study, Jane will build and test a prototype to achieve this target behavior.*

*To get started on the right track, Jane uses the Behavior Wizard. She answers three questions about her behavior change of interest--watching less TV--and the Behavior Wizard labels this behavior type: It's called a “Gray Path” Behavior. Jane knows that this label refers to a generic type of behavior change; it is characterized by a specific underlying psychology and techniques for achieving it.*

*The Behavior Wizard provides Jane with a Resource Guide. It starts out by listing other Gray Path Behaviors, such as eating smaller portions and spending less on clothes. Jane recognizes the similarities to watching less TV. Jane scans down the Resource Guide until she reaches a listing of academic studies, including 13 related papers from the conferences on Persuasive Technology. She*

*sees that research on Gray Path Behaviors come from other topic areas as well, from health to economics. She knows her work will benefit from insights across these domains.*

*Jane also sees a list of theories that can inform her work. She's studied some of these theories already, but some are new to her; they are from different fields. And finally, Jane finds a list of products that have proven effective in achieving Gray Path Behaviors. She doesn't see a product for persuading people to watch less TV, but she knows the persuasion techniques used by the other "Gray Path" products will give her insight how to tackle the TV problem.*

*Thanks to the Behavior Wizard, Jane gets a fast start on her thesis project. She's confident she's headed in the right direction.*

In the above scenario, the Behavior Wizard helps Jane think clearly about the behavior change that interests her. It also guides her to the most relevant studies, theories, and solutions. She doesn't waste time reading about unrelated types of behavior change, such as one-time compliance. She can focus on the psychology of her behavior type--a long-term reduction in an existing behavior. And she can tap into solutions that already work for this type of behavior. The Behavior Wizard greatly improves Jane's chances for a successful project.

## **5. The 15 Types of Behavior Change**

The foundation for the Behavior Wizard is a matrix called the "Behavior Grid" that defines 15 types of behavior. This is a revision of Fogg's previous work that categorized 35 types of behavior [12], a framework that would have required three axes to be precise. We now propose a simpler 15-cell grid that is more practical and conceptually appealing (see [www.BehaviorGrid.org](http://www.BehaviorGrid.org) for details not in this paper).

Two axis form the Behavior Grid. Along the horizontal axis is a dimension we call the behavior "Flavor". As described below, there are five Flavors of behavior. The vertical axis maps out what we call "Duration". The Behavior Grid has three categories of Duration, as described below.

### **5.1 The Five Flavors of Behavior**

The horizontal axis of the Behavior Grid segments behaviors into five Flavors: Green, Blue, Purple, Gray, and Black. The previous labels for these columns were abstract and uninteresting: A, B, C, D, and E [12]. The use of colors to label columns in the Behavior Grid creates a more evocative and memorable framework.

Table 2 provides examples of each Behavior Flavor we discuss below. In the grid we've placed examples, each of which relates to healthy eating behaviors.

A **Green Behavior** is a behavior that is new to the target audience. For example, if someone has never snacked on seaweed, then it's a Green Behavior for that person. For seaweed lovers, this is not a Green Behavior. In Table 2 we've listed examples of Green Behaviors we think would be new to most people: snack on seaweed, eat quinoa, and become a vegan.

Designing to achieve Green Behaviors requires special consideration. This may include making the behavior simpler to do, reducing anxiety, connecting the new behavior to existing practice, providing social support, and so on.

**Table 2.** Examples of 15 types of behavior change, all related to healthy eating, as organized by Fogg’s Behavior Grid.

	<b>Green behavior</b> <small>Do <u>new</u> behavior, one that is <u>unfamiliar</u>.</small>	<b>Blue behavior</b> <small>Do <u>familiar</u> behavior</small>	<b>Purple behavior</b> <small><u>Increase</u> behavior intensity or duration</small>	<b>Gray behavior</b> <small><u>Decrease</u> behavior intensity or duration</small>	<b>Black behavior</b> <small><u>Stop</u> doing a behavior</small>
<b>Dot behavior</b> <small>is done <u>one-time</u></small>	Try eating dried seaweed for a snack today	Eat vegetables at dinner tonight	Increase mindfulness at lunch today	Eat only half of a hamburger tonight	Don’t buy ice cream this time while shopping
<b>Span behavior</b> <small>has specific <u>duration</u>, such as 40 days</small>	Substitute quinoa for rice for one month	Drink water each morning this week	Eat more vegetables at dinner for two months	Eat fewer carbohydrates for one week	Don’t use sugar in coffee for two weeks
<b>Path behavior</b> <small>is done from now on, a <u>permanent change</u></small>	Lead a vegan lifestyle from now on	Take daily vitamins from now on	Increase healthy eating options in home	Decrease fried foods in diet from now on	Stop eating fast food forever

A **Blue Behavior** is one that is familiar to the target audience. For example, walking a mile is a Blue Behavior for most people because most of us have walked a mile before. In Table 2 we’ve chosen behavior examples we believe most people have done before: eating vegetables, drinking water, and taking vitamins.

Designs to achieve Blue Behaviors can draw on past experience. The behavior itself and the expected results of the behavior do not need to be explained, as might be needed for Green Behaviors. At some point a Green Behavior becomes a Blue Behavior as a person becomes familiar with it.

A **Purple Behavior** designates an increased performance of a familiar behavior. Purple Behaviors are existing behaviors that people increase in some way, such as doing the behavior longer, more intensely, or with more effort. For example, walking a mile at normal pace would be a Blue Behavior. But walking faster than usual for a mile would qualify as a Purple Behavior. Also qualifying would be walking farther than a mile or walking uphill.

Table 2 lists examples of Purple Behaviors: increasing mindfulness while eating, consuming more vegetables, and stocking more healthy eating options at home.

A **Gray Behavior** designates a decreased performance of a familiar behavior. The behavior can decrease in intensity, duration, or frequency. Examples of Gray Behaviors include eating less, cutting back on coffee, and working shorter hours.

At times a behavior change can be seen both as a Gray Behavior and a Purple Behavior, like two sides of a coin. For example, someone could reduce TV viewing by replacing it with more walking outside. This Purple-Gray behavior exchange applies in many arenas. It’s a pattern we can now label.

A **Black Behavior** designates a cessation of an existing behavior. For example, quitting smoking is a Black Behavior, as is eliminating all corn syrup in one’s diet. We selected the color black because we felt it connotes an absence or an end.

Some behaviors, such as eating, cannot be completely Black. For example, the renowned Weight Watchers program advocates a few Black Behaviors in eating, but the primary focus is on Gray Behaviors.

Note that the placement of behaviors into the five Flavors, especially for Blue and Green Behaviors, depends on the person who is the target of persuasion. For example, most of our colleagues have never eaten dried seaweed as a snack so this is a Green Behavior; it is new to them. However, some people snack on seaweed often. For those people, it is a Blue Behavior. This example highlights the need to understand the target audience, an important step in any behavior change method.

## **5.2 Benefits of this Approach**

For purposes of research and design, categorizing behavior change into five Flavors is a significant step forward. It can clarify fuzzy thinking quickly. In our various implementations of the Behavior Wizard, testing over 100 people, we found that virtually everyone could answer questions to help them see which of the five Behavior Flavors matched their target behavior. In contrast, without prompting questions related to the Flavors, we found that well over 50% could not articulate their behavior target precisely. This result is not a scientific finding but a confirmation check. This result matches our experience in teaching persuasive design and in working on industry projects. Most people, including professionals in marketing, are not good at thinking clearly about target behaviors. But once given a thinking system, such as Behavior Flavors, they do much better in articulating a target behavior and finding the behavior label for it.

## **5.3 The Three Durations of Behaviors: Dot, Span, and Path**

The other dimension in the revised behavior matrix deals with what we call “Duration”. Three options exist: one time, span of time, or ongoing. Each of these has a short, memorable name to make this framework more workable and appealing.

A **Dot Behavior** is a behavior that is done once. For example, joining a church or clicking on a specific banner ad are examples of a Dot Behavior. In Table 2 we’ve listed other examples of behaviors that are reasonably done as one-time behaviors: eating a seaweed snack today, eating more vegetables one evening, increasing mindfulness during a specific meal, eating half of a hamburger tonight, or choosing not to buy ice-cream during a certain trip to the store. Any of these behaviors can be repeated, of course, but the intervention goal is to influence behavior one time.

Designing to achieve Dot Behaviors differs from the other two categories. Compliance-gaining strategies are prominent [13]. Also the long-term implications of Dot Behaviors are less salient, which may generally give them a lower behavior activation threshold.

In contrast to Dot Behaviors, a **Span Behavior** is a behavior that is done over a period of time. For example, the religious tradition of Lent is all about Span Behaviors. In Table 2, we list examples of behaviors that extend over time: substituting quinoa for rice for one month, drinking water each morning this week, eating more vegetables at dinner for two months, eating fewer carbohydrates for one week, or choosing not to use sugar in one’s coffee for two weeks.

Designing Span behaviors requires special consideration. People must stick to a pattern of action for a certain period of time. Thus, a Span intervention might pay close attention to the strategic use of regular triggers.

Finally, a **Path Behavior** is a behavior that is done from now on, a permanent change. For example, eating only vegetarian food is an example of a Path Behavior. We've chosen the word *Path* to evoke the ongoing nature of the behavior change.

In Table 2, we list examples of permanent, ongoing behaviors: leading a vegan lifestyle, taking daily vitamins, increasing healthy eating options at home, decreasing fried foods in diet, or stopping fast food consumption.

Path Behaviors may be the hardest types of behaviors to induce. Because of their permanent nature, they require a shift in a person's identity or lifestyle. In many cases, the target behavior must be triggered regularly enough to the point that the behavior becomes a habit, part of a person's routine or a reflexive response.

## **6. The Three Phases of the Behavior Wizard**

With the 15 behavior types mapped out above, we will now explain the overall method for the Behavior Wizard. This has three phases.

### **6.1 Phase 1. Clarify the target behavior & distinguish from others**

The first phase of the Behavior Wizard is to isolate and identify the target behavior. The previous sections describe the classification scheme.

One goal is to make this phase simple enough that everyday people could classify target behaviors without training. We tested four ways to do this. The first method was to have people view the matrix of 15 items and select the cell that matched. However, people got overwhelmed by the complexity.

In our pilot testing of over 100 people, we eventually found that a better method was to ask simple questions in a branching decision tree. Our current implementation for classifying a behavior type is a series of questions with no more than three options. (For specifics on our current approach, see [www.BehaviorWizard.org](http://www.BehaviorWizard.org).)

### **6.2 Phase 2. Identify what triggers the behavior**

After classifying the target behavior into one of 15 types, the Behavior Wizard method moves on to phase two. The next task is to identify how the target behavior is triggered.

One trigger option we call a "Cycle" Behavior. This means the target behavior happens on a predictable schedule. It could be daily, weekly, and so on. For example, for most people the behavior of brushing teeth is a Cycle Behavior. People brush in the morning and at night. The time may not be exactly the same each day, but it's part of a routine people have. (Technically, brushing teeth is a Blue Path Cycle Behavior, but this additional layer goes beyond the scope of our paper.) Other Cycle Behaviors include going to church once a week, paying bills once a month, or celebrating a birthday once a year.

The next trigger option we call a "Cue" Behavior. This means the target behavior happens in response to a cue that is unpredictable; it's not on a schedule. For example, when Facebook notifies people they have been tagged in a photo, that cue can trigger people to log into Facebook to view the photo. Another example: If someone waves at us, we will probably wave back. For us, this friendly cue leads to an automatic social response. Note that some cues might be internal. For example, if a woman has a headache, that pain can be a cue to action, such as taking medication.

In our view, knowing how a behavior gets triggered is important enough that it deserves a separate phase in the Behavior Wizard. It's clear that triggers apply to Green, Blue, and Purple Behaviors. In addition, triggers can affect Gray and Black behaviors. One approach to achieving Gray and Black Behaviors is to minimize or remove the trigger. For example, if the target behavior is to stop logging into Facebook while at work, one can turn off email notifications. This removes the trigger and reduces the likelihood of logging into Facebook.

### **6.3 Phase 3. Highlight concepts and solutions related to target behavior**

The third phase in the Behavior Wizard is to highlight the theories, models, and solutions for the behavior type of interest. This is where the Behavior Wizard generates relevant information for those creating the persuasive experience. We call this compilation a "Resource Guide". In the scenario with the grad student, Jane received a Resource Guide about Gray Path Behaviors.

In creating the Resource Guides, we've followed a template that currently has seven parts, as shown below.

**Title: [Type of Behavior]**

Description: Perform X Flavor on Y Duration

1. Behavior examples
2. Techniques to achieve this behavior
3. Implementations that achieve this behavior
4. Factors from Fogg Behavior Model (motivation, ability, triggers)
5. Relevant theories and models
6. Related types from Behavior Grid (a. same Flavor b. same Duration)
7. Behavior change patterns that match this type

Each Resource Guide is unique, but some content is duplicated across guides. For example, all Black Behaviors share commonalities. So we've put some of the same information in Resource Guides for Black Dot, Black Span, and Black Path behaviors. The guides also point out relationships among behavior types. For example, when it comes to creating new habits, targeting a Blue Span Behavior first may be a good step before tackling a Blue Path Behavior.

In a similar way, the behavior types listed in rows share commonalities. These are described in the Resource Guides. For example, if a Black Path Behavior is the ultimate goal, a more palatable prior behavior may be a Gray Path Behavior. Note that sequences of target behaviors get a lot easier to map out and discuss when using the categories and terminology from the Behavior Grid.

Our work on the Resource Guides may never be complete, since there's always more to add as new knowledge gets created and new products are shown to be effective. For example, every day it seems a new smartphone app could be added to one of the 15 Resource Guides. Also, as hundreds of experiments about behavior change happen around the world, including those in industry, new insights continually emerge for the behavior types. To address this reality, we post periodic updates to the Behavior Guides at [www.BehaviorWizard.org](http://www.BehaviorWizard.org).

## **7. Mapping Research in Persuasive Technology**

As members of the Persuasive Technology community, we wanted to map research from our annual conferences into the matrix of 15 behavior types. However, as we

read published papers looking for the target behaviors, we found that some studies weren't clear. At times the research measured attitudes, while the paper's discussion focused on behavior. Yet the link between attitude and behavior change was not explicit. We did not include those papers in the mapping below.

In Table 3 we've bolded the names of researchers that measured that behavior type directly. Note that nothing in the Path Behaviors is in bold. This makes sense. Most research methods are not well suited for showing a permanent change in behavior.

Often researchers showed a one-time change during an experiment, or a change over a period of time in a field trial. These are Dot and Span Behavior outcomes. Yet some of these findings, we believe, have implications for long-term behavior change. In those cases, we included names of the first authors in Path Behavior column of Table 3, but without the bold typeface. For example, Forget et al. (2008) investigated how to persuade people to create more secure passwords using a new method. The study measured behavior change during the experimental session, a one-time behavior. But the work implies that long-term behavior is possible if this approach were scaled up. So in this case, we've listed the study in bold as a Dot Behavior and listed it again in nonbolded typeface as a Path Behavior.

**Table 3.** Research published in previous Persuasive Technology conferences, organized by behavior type. Bolded names indicate studies that measured that type of behavior [14-60].

	<b>Green behavior</b> Do <u>new</u> behavior, one that is <u>unfamiliar</u>	<b>Blue behavior</b> Do <u>familiar</u> behavior	<b>Purple behavior</b> Increase behavior intensity or duration	<b>Gray behavior</b> Decrease behavior intensity or duration	<b>Black behavior</b> Stop doing a behavior
<b>Dot behavior</b> is done <u>one-time</u>	Ahrens et al. (07) Forget et al. (08) Ramachandran et al. (08) Iyengar et al. (09)	Harper et al. (07) Ahrens et al. (07) Gamberini et al.(07) Felfernig et al. (07) Vossen et al. (09)	Eyck et al. (06) Niebuhr et al. (07) Frolich (08) Reitberger et al. (09)	McCalley et al. (06) Bickmore et al. (07) Frolich (08) Ham et al. (08)	
<b>Span behavior</b> has specific <u>duration</u> , such as 40 days	Revelle et al. (07) Parmar et al. (08) Chi et al. (08) Harjumaa et al. (09) Ferebee et al. (09)	Sterns et al. (06)	Gasser et al. (06) Goris et al. (08) Firpo et al. (09) Saini et al. (09)	Kappel et al. (09)	Dijkstra (06) Kraft et al. (07) Gable et al. (07)
<b>Path behavior</b> is done from now on, a <u>permanent change</u>	Bang et al. (06) Lucero et al. (06) Tscheligi et al. (06) Reitberger et al. (07) Parmar et al. (08) Chi et al. (08) Obermair et al. (08) Forget et al. (08) Kraft et al. (08) Lockton et al. (09) Ferebee et al. (09)	Sterns et al. (06) Wai et al. (07) Brodie et al. (07) Fogg et al. (08) Consolvo et al. (09) Olsen & Kraft (09) Saini & Lacroix (09) Vossen et al. (09) Harjumaa et al. (09) Ranfelt et al. (09)	Tscheligi et al. (06) Bang et al. (07) Reitberger et al. (07) Wai et al. (07) Murthy (poster 08) Berkovsky et al. (09) Firpo et al. (09)	Bang et al. (06) McCalley et al. (06) Bickmore et al. (07) Kraft et al. (07) Bang et al. (07) Mahmud et al. (07) Drozdz et al. (08) Ham et al. (08) Kraft et al. (08) Midden & Ham (09) Shiraishi et al. (09) Kappel et al. (09) Duncan et al. (09)	Dijkstra (06) Grolleman et al. (06) Kraft et al. (07) Khaled et al. (07) Gable et al. (07) Kraft et al. (08) Khaled et al. (08) Raisanen et al. (08)

In the scenario about Jane earlier in this paper, the Behavior Wizard gave her 13 studies that related to her Gray Path Behavior of interest. The studies Jane saw are those listed in Table 3. Jane's Resource Guide also listed the other papers in the Gray

Behavior column, because these studies may have implications for her work as well. For example, what Bickmore et al. (2007) learned about influencing people to take breaks from the computer during an experimental setting may help Jane in designing a system for reducing TV viewing in a real living room. In addition, the research methods Bickmore et al. used, including the measurement techniques, may be what Jane needs for her thesis project.

Table 3 suggests some questions for future investigation. Why did so many Blue Dot studies emerge in 2007? Why are Gray Path Behaviors so numerous? Would conferences in other domains, such as marketing or behavioral economics, show a different pattern of emphasis? Answering these and related questions is beyond the scope of this paper, but these issues would make for interesting future study.

As we move forward with the Behavior Wizard, we continue to add new insights to the database. This will come from persuasive technology conferences as well as other domains, such as health marketing, consumer behavior, web analytics, behavioral economics, and more. The organizing factor for the emerging insights won't be the traditional labels like marketing or economics; instead, the Behavior Grid makes it possible to organize insights by types of behavior change. The Behavior Wizard builds on this framework to match solutions to target behaviors of interest. One primary goal of our work here is to create common ground that transcends traditional boundaries of academic disciplines and industry functions. That common ground is type of behavior change.

## **8. The Behavior Wizard and Beyond**

The Behavior Wizard not only provides a common approach to categorizing behavior, but we believe its components allow for a deeper understanding of the winning patterns of behavior change. In this method, each row and column represents one characteristic, so we are able to see potent relationships amongst the sub-types when moving throughout the grid – either across a row or along a column.

Consider, for example, the domain of habit formation, which represents just one section of the overall Behavior Grid. Moving down a column could describe one process of habit formation. Specifically Dot Behaviors flow into Span Behaviors, which can then, with enough repetition, become Path Behaviors. So if we are interested in creating a habit in a customer, or just understanding how the process works, we first look at the common characteristics of Dot Behaviors: What tactics trigger them? How strongly does context control one-time decisions? And especially, how easily can we repeat the success? Then, we can move to Span Behaviors, finding the best ways to succeed for a fixed period of time. Finally, we can move onto Path Behaviors. In this way, we can break the process of habit formation down into smaller, more tractable pieces.

The Behavior Wizard helps focus thinking on a concrete set of behavior changes, organizing what has long been a messy landscape. In combination with the triggering methods, the 15 behavior types can serve as building blocks for persuasive design. Today researchers and designers can use elements of the Behavior Wizard to build and test specific solutions. Yet greater potential remains. We anticipate such a systematic approach will eventually show how smaller units of influence can combine into larger patterns of persuasion. We share future insights and developments at [www.BehaviorWizard.org](http://www.BehaviorWizard.org).

In the near term, a systematic approach to designing for behavior change can empower us to create persuasive technologies more efficiently. In the coming years, tools for automating behavior change, such as future iterations of the Behavior Wizard, will become more sophisticated and effective. As this happens, we believe that humans will play increasingly smaller roles in testing and improving persuasive technologies. Ultimately, it won't be researchers or designers who create what shapes human behavior. This will be a job for computers.

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