STRATEGIC DESIGN RESEARCH JOURNAL

Behavioral planning: Improving behavioral design with "roughly right" foresight

Ruth Schmidt [a] * | Katelyn Stenger [b]

[a] Illinois Institute of Technology, Institute of Design: Chicago, USA.
[b] University of Virginia, Department of Engineering Systems and Environment, Charlottesville, USA
* Corresponding author: schmidt@id.iit.edu

ABSTRACT

Many challenges emerging from the current COVID-19 pandemic are behavioral in nature, which has prompted the field of behavioral design to propose solutions for issues as wide-ranging as hand-washing, wearing masks, and the adoption of new norms for staying and working from home. However, on the whole these behavioral interventions have been somewhat underwhelming, exposing an inherent brittleness that comes from three common "errors of projection" in current behavioral design methodology: projected stability, which fails to recognize that interventions often function within inherently unstable systems; projected persistence, which neglects to account for changes in those system conditions over time; and projected value, which assumes that definitions of success are universally shared across contexts. Borrowing from strategic design and futures thinking, a new proposed strategic foresight model—behavioral planning—allows practitioners to better address these system-level, anticipatory, and contextual weaknesses by more systematically identifying potential forces that may impact behavioral interventions before they have been implemented. Behavioral planning will help designers more effectively elicit signals indicating the emergence of forces that may deform behavioral interventions in emergent COVID-19 contexts, and promote "roughly right" directional solutions at earlier stages in solution development to better address system shifts.

Keywords: Behavioral Design, COVID-19, Foresight, Planning.

INTRODUCTION

As crises go, the COVID-19 pandemic is a natural fit for behavioral design, a field informed equally by psychology and economics that focuses on redirecting "irrational" behaviors through redesigned choice architecture and nudges. Indeed, coronavirus' impact on personal and professional behavioral norms has thrust the field into the spotlight, prompting behavioral experts to tackle handwashing, social distancing, mask-wearing, and shelter-in-place behaviors (Lunn et al., 2020) to contain the virus' spread. Yet despite the clear applicability of behavioral insights, the collective results of these behavioral interventions have underwhelmed, suggesting that behavioral solutions as currently conceived may be limited in their effectiveness.

Typically, behavioral interventions combine findings from empirical experiments with knowledge about the target environment to deliver measurable behavioral change. But as COVID-19 has amply established, contexts are frequently dynamic and unstable, even volatile, and at the mercy of internal and external stressors: a classic "wicked problem" (Rittel & Webber, 1973), rather than the stable, well-defined context in which behavioral

interventions thrive. As a result, traditional behavioral approaches may inadvertently produce solutions that initially appear robust, but become fragile as conditions change or individuals adapt to new norms (Smith et al., 2009). Even when interventions achieve short-term success they may quickly become brittle when conditions change, coming at the expense of greater resilience and longer-term impact (Sanders et al., 2018) and remaining perpetually reactive rather than proactive in their positioning and tactical rather than strategic in their ultimate aims.

We suggest that a more generative, foresight-driven behavioral approach borrowing from strategic design—behavioral planning—can improve behavioral solutions to COVID-19 and similarly complex crises by solving for three common "errors of projection" that currently contribute to behavioral solution brittleness: projected stability, which fails to recognize that interventions function within inherently unstable systems; projected persistence, which neglects to account for changes in system conditions over time; and projected value, which assumes that definitions of success are universally shared across contexts.

1. ERRORS OF PROJECTION

1.1. The Error of Projected Stability: Solutions within Systems

While COVID-19 has no shortage of behavioral issues to address, it is also undeniably a systems challenge in which the ultimate goal—infection containment—requires a system-level solution coordinating issues of public health, equity, and resource allocation. Behavioral design methodology typically focuses on achieving highly specified behavioral change, using findings derived from empirical experiments to inform behavioral interventions. While this may work in a stable system, life is not so simple; optimizing interventions for narrowly-defined behavioral challenges can inadvertently strip out too much important ancillary system information, resulting in bounded approaches that can't address real world complexity. In addition, experiments designed to achieve internal validity within lab confines may not necessarily prove externally valid in more complex real-world settings (Camerer, 2011).

A second result of this narrow focus is a tendency to prioritize tactical efficiency over system-level effectiveness, which means even successful behavioral interventions may miss the mark strategically if they fail to contribute to system outcomes. "Opt-out" organ donation, long used as an exemplar of behavioral design success (Johnson & Goldstein, 2003), provides a useful example. While making organ donation a default, rather than an active choice, can increase the number of potential organ donors, recent studies recognize that declared consent achieves higher actual donations when family overrides of presumed consent are taken into account (Lin et al., 2018). Narrowly focusing on the behavioral mechanism of consent also neglects that the presence of donor coordinators at hospitals can be an even stronger lever in promoting successful transplants (Sarlo et al., 2016), as well as other factors that materially impact both organ donation and transplant success rates (Wojda et al., 2017), such as disparities in donation rates and organ waste across ethnic groups, or uneven demand for particular organs.

The need to consider systems is critical to successfully addressing to COVID-19 challenges, both in obvious system-level tensions between shelter-in-place directives and economic motives to open businesses but even in "simple" behaviors such as wearing masks. Even if

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worn, evidence indicates that mask effectiveness relies on regular use, correct fit, and adherence to cleaning and replacement regimens, requiring solutions to overcome a wide range of individual and system-level obstacles, including supply and demand, visceral discomfort (MacIntyre et al., 2015), implicit political associations (Pew Research Center, 2020), and identity issues (Sunstein, 2020) that may stigmatize essential public health recommendations.

Finally, an overly narrow focus on behavioral change over system effects has implications on evaluation and what success looks like. Where systemic outcomes can be difficult to capture in simple quantifiable terms, behavioral change tends to be highly measurable, and thus appealing as a marker of success even when behavioral change is not the best indicator of desired outcomes. This suggests that randomized control trials (RCTs), long considered the gold standard of intervention efficacy, may offer false precision, potentially valorizing measurability over actual impact (Deaton & Cartwright, 2018).

1.2. The Error of Projected Persistence: Anticipatory Evidence

Resituating behavioral change interventions as elements in a system, rather than as isolated components, is necessary but insufficient in the face of the second error of projection: even the simplest of systems don't stand still, demanding that we design not simply for today's conditions but with the recognition that external contexts and personal conditions are always in flux. Considering emergent contexts and conditions, or the impact of initial solutions on future states, is by no means a plea or expectation to predict the future. Rather, it simply suggests the value of designing solutions with the knowledge that change is inevitable, and that solutions must be considered as components of continually evolving systems.

Failing to consider the dimension of time can have significant implications in a swiftly evolving context such as COVID-19. One such instance occurred when the U.S. Center for Disease Control initially did not recommend that the general population wear masks in response to immediate concerns of personal protective equipment (PPE) shortages, especially N-95 masks (Center for Disease Control, 2020). While this message addressed the immediate issue of supply and demand for N-95 masks, it also acted as a conceptual anchor by reducing peoples' receptivity to subsequent messaging that masks provided essential protection for everyone regardless of their disease status (Garrett, 2020). Taking a more longitudinal view can also help to surface important second-order effects from interventions. Studies in Rome, Italy, for example, suggest that further research on shelter-in-place interventions face diminishing returns given their overall success and the increasingly more important need to address boredom and mental health issues that have surfaced as a result of prolonged periods of home-bound time (Barari et al., 2020).

Applying a temporal lens to behavioral interventions also impacts how we define and evaluate success given that, almost by definition, solutions for future states that don't yet exist cannot be tested using traditional evaluative instruments. Currently, intervention efficacy is characterized by the extent to which we can achieve short-term, measurable behavioral change through evaluative mechanisms such as RCTs. While still useful and valid, the additional desire to measure progress toward larger system outcomes suggests a need to reframe evaluative testing from the natural conclusion of a linear process to feedback mechanisms within iterative ones that provide fodder for course-correction.

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Taking an anticipatory stance toward COVID-19 interventions may therefore require looking beyond traditional lagging metrics such as mask-wearing, numbers of infections, and healthcare utilization to also embrace leading metrics such as increased group activity in nicer weather or shortages of disinfectant wipes that provide "weak signals" of emergent future states (Ansoff, 1975). Where lagging metrics look backwards, leading metrics provide directional indicators of near-future states (Fuerth, 2009), demonstrating whether we are making progress toward the larger outcomes we seek before more traditional metrics are more formally employed, and allowing practitioners to consider potential downstream issues or root causes at an earlier stage.

1.3. The Error of Projected Values: Defining What's "Normal'

Herbert Simon famously declared that designers convert current states into preferred ones (Simon, 1969). Conveniently ignored in this statement, however, is the underlying question "preferred for whom?" and its close cousins, "who defines what success looks like?" and "who decides which problems deserve attention?" Many solutions to prominent COVID-19 behavioral targets—handwashing, and increasing social distancing and working from home during shelter-in-place mandates—assume access to resources like clean water (World Health Organization, 2020), WiFi, and the ability to work remotely that are far from universal. At best, these interventions reflect the limitations of choice architecture; at worst, they reflect norms and privilege that demonstrate a narrow view of diverse real-world contexts or even amplify existing system inequities, as seen in data indicating that Black and Brown groups are at higher overall medical risk, and also more likely to work in "essential" or service roles that can't be executed from home (Bassett et al., 2020).

Assumptions of easy access to resources belie a belief in the existence of universal experiences and values. When interventions ignore the broader socio-economic system context, they also risk dismissing the degree to which community or legacy perceptions impact personal behaviors, and where a legitimate lack of trust and credibility can contribute to brittle outcomes. Perceptions fed by news sources may impact peoples' reluctance to seek medical treatment for COVID-like symptoms or other health care needs such as prenatal care (Li et al., 2020) due to the perceived contagiousness of hospitals or fear of overburdening medical systems, but even seemingly non-controversial health messages delivered by experts can invite skepticism in communities with a historical distrust of medical professionals (Meng et al., 2016).

The field's tendency to conflate empirical results with actual applications of use only exacerbates this effect. When researchers employ going to the gym as a proxy for improving personal health, for example, the use of this seemingly neutral surrogate activity can negate real-world issues of access, affordability, physical ability and identity that directly conflict with many individuals' lived experience (Cohen et al., 2016). In the context of COVID-19, recommendations to wear masks ignore the nature of heterogeneous effects and the reality that Black men in the U.S. have a legitimate fear that donning face-coverings trade off one form of safety (public health) for another (racial profiling and assumptions of criminality) (Yancy, 2020). Solutions that address cognitive biases while neglecting the body they live in may fail to deliver desired outcomes, and expose fractures between experimental results and real life. When experiments, hypotheses, and notions of normal are defined by historically privileged ideals and populations, even the most rigorously conducted studies may conflict with the real-life contexts in which interventions play out. Participatory design, increasingly

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used in the context of design activities to provide power and a voice to the formerly excluded, can play a useful role to uncover and overturn these assumptions.

2. A PROPOSED FORESIGHT MODEL: FORCES OF CHANGE

How, then, are we to address these errors of presumed stability, persistence, and values to design COVID solutions with systems, flux, and privilege in mind? We suggest that applying a scenario-based foresight lens can reduce the brittleness of behavioral interventions: By playing out the potential consequences of evolving conditions and the resultant system-level and individual adaptations to those shifts, we can design more flexible, or "plastic," solutions with increased resilience.

Applying a scenario-based sensibility to behavioral design may initially seem misguided, given the field's traditionally empirical, evidence-based methodology. But looking to data incorrectly presumes that we can always reason from precedent in a swiftly shifting context; instead, "roughly right" strategic speculation about probable, possible and plausible futures, with roots in scenario planning (Schwarz, 2009), the futures cone (Voros, 2003), Ansoff's theory of weak signals (Ansoff, 1975) and Gaspard Berger's theory of La Prospective (Berger et al., 1960), may be better positioned to provide both anticipatory and concretely actionable approaches to navigate complexity.

Just as behavioral economics itself emerged in reaction to economics' overly simple explanations for human behavior (Kahneman, 2011), behavioral planning can address behavioral science's limitations by helping us speculate on how the presence of an intervention we've implemented will intervene in that system, and how the presence of other conditions within the system are likely to deform intervention effectiveness. The deformation of physical materials, which retain their structural integrity in the face of slight tensions but whose inherent fragility becomes evident when they encounter stronger forces, is an instructive analogy. Behavioral interventions may function perfectly well within stable environments, and only when subjected to acute or accumulated forces—such as contextual factors or other system incentives—is their brittleness suddenly exposed. By more proactively identifying the nature of these forces, and how they might derail interventions from their initial intent through behavioral planning, we can better build in resilience and feedback systems to identify potential breakdowns or challenges before they occur.

Identifying these forces requires a systematic approach, which allows us to explore and express potential tensions in a structured way. To do this, we propose the use of a forces model (Figure 1) that consists of quadrants created by bisecting two dimensions in tension, where the intervention at the center acts and is acted upon in equal measure, disrupting the system simply by being present and serving as a nexus for behavioral planning.

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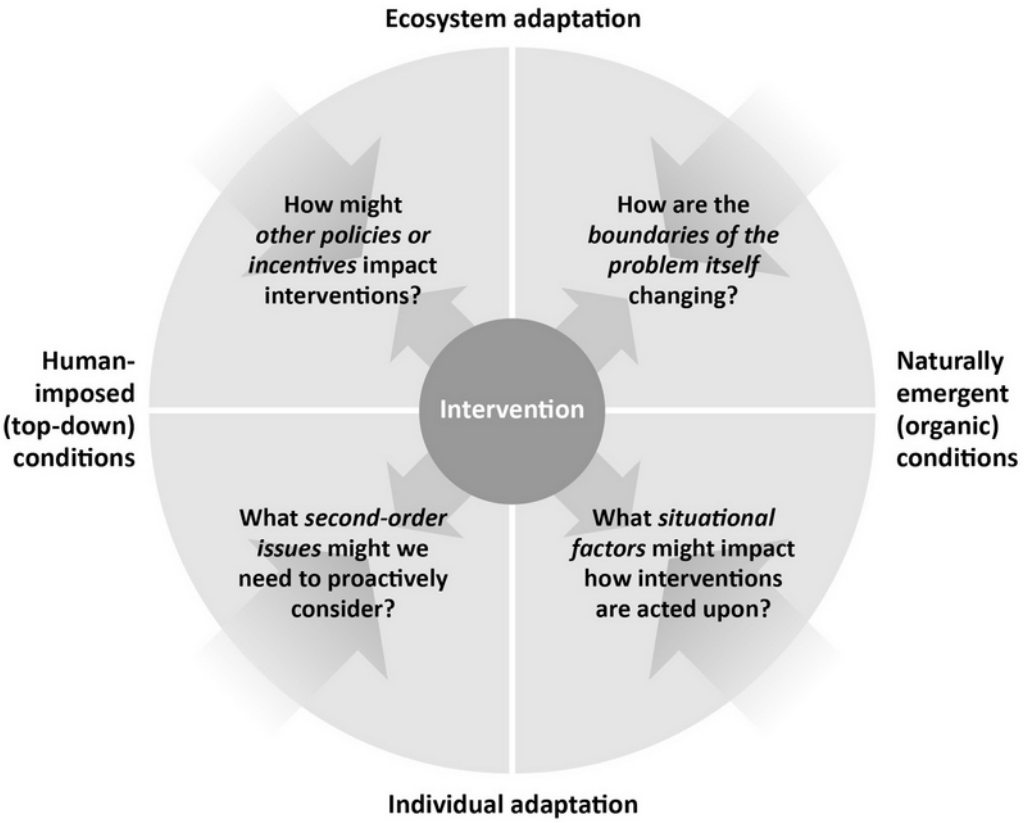

Figure 1. Intervention forces model.

The horizontal dimension depicts the tensions between contrasting conditions within which interventions are situated, with human-imposed, top-down, conditions—rules, policies, and directives with the express intent to cause behavioral change or the adoption of new norms—on one side, and more organic, naturally emergent conditions on the other. In a COVID-19 context, for example, the former might take the form of governmental orders, organizational requests to wear masks on-premises, or other forms of guidance from official sources. In contrast, the latter set is composed of more organically occurring conditions or societal shifts that are less engineered than synergistic, and coalesce without official decree or centralized organization: the international, grassroots response to Black Lives Matter, seasonal ebbs and flows, or even the emergence of the coronavirus itself. This dimension can help us consider interventions in the context of systems, addressing our error of projected stability.

The second (vertical) tension considers adaptation, pitting ecosystem-level responses to interventions against individual adaptations that may occur as a result. Where ecosystem adaptation captures the collisions or conversations between and amongst system elements that result in changes to system-level contexts—such as the impact of AirBnB™ on the hotel industry and individual rental markets—individual adaptation occurs at the level of individual people or entities as they adjust to new normals, resist interventions in acts of reactance, or develop second-order behaviors as a direct result of interventions. Here we can address our error of projected values by considering how personal and ecosystem adaptations might reflect choices due to individual user contexts. Finally, in envisioning how these conditions and adaptations collectively yield four aspects of potential future scenarios that could arise from these forces acting on interventions, we can tackle our final error: that of projected persistence, and the knowledge that things change.

In each quadrant, however, the presence of forces is not to be construed as a negative; forces can create additional stress on interventions, but can also reinforce or bolster their intent. In

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the same way that social norms to dissuade drunk driving carry more weight when coupled with financial and legal penalties for DUIs, social norms for mask-wearing that are reinforced with tangible punitive measures, such as denial of shopping privileges at stores with mandatory mask policies, may boost usage (Politis et al, 2013). Whether positive or negative, identifying these potential forces and implications can help us increase our sensitivity to early or weak signals of potential system change. While behavioral interventions cannot—and should not be expected to—alleviate all these issues, recognizing where they exist can contribute to more future-facing, system-oriented solutions that are informed by the values of its participants. We examine each quadrant in more detail below.

2.1. How Might Other Policies or Incentives Impact Interventions?

Some emergent conditions can be characterized by ecosystem-level interactions between human-imposed forces and potential new interventions that cause solutions to function differently than they might have been expected to in isolation. For example, behavioral interventions that were successful in encouraging farmers to adopt a new water-saving farming approach in the water-scarce Colorado River Basin failed in their ultimate goal—to decrease the total amount of water used—when they conflicted with "use-it-or-lose-it" water policies (UCRC Staff & Wilson Water Group, 2018). COVID-19's complexity, diversity of stakeholder perspectives, and rapidly shifting context supplies numerous examples in the form of hand-washing or mask-wearing "nudges" that are alternately augmented or stymied by conflicting messages and directives from federal governments, health care organizations, and individual businesses.

Just as behavioral interventions are impacted by other incentives and policies, they also exert their own influence on the ecosystem of persuasive elements. This can occur even in simple systems as "substitution effects" when automatic payment nudges inadvertently offset other forms of debt reduction (Adams et al., 2018). But reconsidering issues that typically sit outside of behavioral inquiry—such as how interventions are influenced by other system elements, or measuring contributions to system outcomes rather than as ends in themselves—may be even more critical in complex contexts like COVID-19 where progress toward larger system goals may suffer even when interventions work as planned.

2.2. How Are The Boundaries of The Problem Itself Changing?

In other cases, interventions can be shaped or deformed by organically occurring system-level forces that arise when the nature of problem space itself naturally evolves. When shifts become sufficiently significant, they can render interventions irrelevant: For example, while the Save More for Tomorrow™ program has historically used opt-out and auto-escalate nudges to successfully encourage long-term financial investment in 401ks (Thaler & Benartzi, 2004), it may prove increasingly brittle as the cohort of gig economy workers without 401ks grows.

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In the case of the COVID-19 pandemic, some naturally emergent shifts may occur less in direct response to the changing disease state than to ancillary behaviors, such as working from home. Recent studies already suggest that the pandemic's combination of closed schools and work-from-home is contributing to significant disparities between male and female research publication productivity in a world where women bear the brunt of family caretaking (Viglione, 2020). As a result, a generation of women is likely to lose professional

ground even as their male counterparts maintain a normal publishing rate, with potentially significant and long-term implications for future tenure and promotion decisions.

2.3. What Second-order Issues Might We Need To Proactively Consider?

The third type of displacement occurs when individuals personally adapt to top-down forces and interventions. This can be useful when habit formation sticks beyond its original prompts, but can also lead to more perverse outcomes as in the "cobra effect" (Siebert, 2001): Faced with a city overrun by cobras, Delhi officials introduced a reward for turning in captured snakes, inadvertently incenting a new market in snake breeding that increased its slithery population rather than decreasing it.

Even when initially successful, behavioral interventions can wane in efficacy as individuals adapt. Suggestions to sing 20 seconds of favorite songs to ensure sufficiently rigorous hand washing may lose its novelty, resulting in waning motivation (Damgaard & Gravert, 2018) and adopting desirable behaviors like mask-wearing may perversely increase the likelihood that individuals feel protected enough to act on other risky behaviors (Nettle et al, 2012). But the second-order effects of interventions can also take graver turns. While stay-at-home orders to combat the spread of COVID-19 have been widely successful and gained broad citizen support to combat the public health emergency, for example, new evidence also suggests a corresponding increase in mental health issues (Barari et al., 2020) and escalations in child abuse and domestic violence (Bradbury-Jones & Isham, 2020).

2.4. What Situational Factors Might Impact How Interventions Are Acted Upon?

Finally, naturally occurring conditions and situational factors can also shape how people respond to interventions. New Year's resolutions supply a familiar example of attaching habit formation to an otherwise arbitrary day of the year, but it's also been shown that organ donation peaks in the summer due to a heightened level of risky activities that lead to accidents and brain death (Kamalia et al., 2019). When cyclical forces are known and predictable, we can craft solutions aimed at preempting nonadherent behaviors, rather than reacting to them once they have occurred. In the case of COVID-19, for example, we can anticipate that nicer weather, which makes congregating more tempting and masks more uncomfortable, will contribute to violations of social distancing and mask-wearing. Proactive approaches make a difference: While the mass Black Lives Matter gatherings in summer 2020 could have contributed to additional COVID infections spikes, current evidence indicates that this did not occur in large part because the events took place outside and protestors took precautions.

3. FORCES AS FORESIGHT

Given the short wavelength on which the COVID-19 pandemic continues to evolve, failing to apply foresight mechanisms such as behavioral planning risks being short-sighted and non-strategic, and destined to result in reactive solutions. However, the call for increased foresight also has methodological and conceptual implications that challenge some of behavioral design's fundamental assumptions, re-centering what we design for, how we define desired outcomes, and how to measure success.

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The quantitative evidence-based processes typically used in behavioral design, such as empirical experimental data and randomized controlled trials, are designed to deliver confidence in solutions. But treating past data as evidence of future success, and evaluation as an end-point rather than input for further refinement, also presumes that the past is all we need to design for the future, and that proof of efficacy will stand the test of time and across contexts. Scientific rigor can come at a cost: conducted under controlled environments and pithed of real-world context, these findings tend to capture "average" measures, and are more likely to prove the success of individual experiments than the applicability of those findings to actual settings. In other words, where empirical data allows us to design more precisely for what we know, it is less helpful when we need to construct solutions for what we don't yet know.

Optimizing for the known risks dooming behavioral design to continually tinker with tactical solutions at the margins, keeping us from considering speculative and "roughly right" hypotheses that expand our sense of what could be to address emergent factors more successfully (Schmidt, 2020). Achieving longitudinal, systems-level success may require the field of behavioral design to augment confidence in quantifiable, measurable evidence with other, more qualitative inputs, and require that practitioners develop a new level of comfort with being directionally, rather than precisely, right. Where foresight tools like the forces model and the use of leading measures cannot deliver certainty, they do provide new lenses of plausibility and legitimacy, contributing to better hypotheses and correcting for errors of presumed stability, persistence, and shared values that have too long gone unquestioned.

ACKNOWLEDGMENTS

The authors are grateful to many colleagues, collaborators, and commenters.

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