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Busara Groundwork

THOUGHT PIECE

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From linear insights to systemic solutions:
the future of behavioral science

THOUGHT PIECE

Busara

Abbreviations and acronyms

ABM	Agent-Based Model
ANC	Antenatal Care
BIT	Behavioural Insights Team
COM-B	Capability, Opportunity, Motivation–Behavior
CREATE	Cue, Reaction, Evaluation, Ability, Time, Experience
GBV	Gender-Based Violence
GST	General Systems Theory
NGO	Non-Governmental Organization
PENN SoNG	University of Pennsylvania's Social Norms Group
RCT	Randomized Controlled Trial
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
V/S	Victim/Survivor

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Executive summary

Author's Note: Busara has previously explored quantitative methods and systems thinking in more detail. This article is meant to link systems thinking to real-world applications in behavioral science. For a more practical guide on using systems thinking, check out Behavioral systems: Combining behavioral science and systems analysis. It walks you through breaking down behavioral problems and understanding how different factors connect within a system.
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Behavioral Science has traditionally focused on understanding and influencing human behavior by identifying factors driving specific and directly related decisions. This linear approach, simplifies complex scenarios into isolated variables, and has provided the foundational insights for developing targeted interventions. While this perspective has proven effective in many cases, it may only sometimes fully capture the broader context in which behaviors occur, as a linear understanding alone is insufficient to grasp the complexities of human behavior fully. It misses important considerations like ripple effects and second-order effects. This is where systems thinking emerges as a valuable complement to applied behavioral science. By shifting from a singular, cause-and-effect perspective to a multi-layered, multidimensional approach, systems thinking allows us to see behavior not as an isolated event but as part of a broader system influenced by many interconnected factors that interact in dynamic and often unpredictable ways.

As we explore this intersection, it becomes clear that combining these approaches doesn't just add depth to our analysis—it transforms it. We move from a two-dimensional view of behavior to a three or even four-dimensional understanding, where the system as a whole is more than just the sum of its parts. This systemic perspective complements and expands traditional linear methods, providing a more robust framework for addressing the multifaceted challenges we face in understanding and influencing human behavior.

The push for evolution in behavioral science and the imperative need for change

Systems thinking and related disciplines and tools (such as agent-based modeling or stakeholder mapping) have long existed. However, they have only recently gained traction in mainstream behavioral and social sciences. This resurgence can be traced back to the work of Prof. Donella Meadows in her seminal book, Thinking in Systems (2008), which built on earlier research by figures like Jay Forrester in the late 20th century (Forrester, 1994; Forrester, 1999) and the general systems theory (GST) from the mid-20th-century (Von Bertalanffy, 1972). These concepts have long been applied in fields like engineering systems, game theory, and computer science. So, a good question we might ask ourselves is: what is driving the current shift toward systems thinking in behavioral science?

One key reason for this shift is the ongoing effort to strengthen the robustness of applied behavioral science tools and methods, particularly in response to the credibility crisis the field has faced in recent years. This crisis stems from issues like the replication crisis and high-profile retractions, such as the case of Diederik Stapel (Bhattacharjee, 2013). Compounding these concerns is the long-standing claim within applied behavioral science that minor adjustments in context can create substantial impact—a notion that often fails when addressing the complex behavioral challenges prevalent in the Global South. The replication crisis, gaining prominence in the early 2010s, revealed that many studies could not consistently reproduce results across different settings (Maxwell, Lau, & Howard, 2015). It also highlighted issues such as publication bias, where studies showing significant effects were more likely to be published, fueling practices like data falsification, p-hacking, and selective reporting (Peplow, 2014; Head et al., 2015). Furthermore, behavioral inter-

ventions, especially nudges, have been questioned for their limited scalability (Hummel & Maedche, 2019), with even Richard Thaler, a founding figure of behavioral science, acknowledging these limitations in long-term efficacy (Thaler & Sunstein, 2021). In response to these challenges, the field has embarked on widespread reflection, aiming to enhance its methods, values, and impact and move to address the more complex and pressing issues that limit more conventional methods.

At Busara, we have been engaging in a process of reflection over the past few years. We are deeply committed to enhancing the quality and impact of our work. This commitment has led us to intensify our exploration of the intersection between applied behavioral science and systems thinking. By doing so, we aim to strengthen the robustness of our analyses and continue pioneering cutting-edge research and development of behavioral science tools and practices tailored to the Global South.

A manifesto for behavioral science: the call for complexity

In 2023, the Behavioral Insights Team (BIT) published a manifesto for behavioral science that critically reviewed the field and addressed concerns about the validity and impact of research (Hallsworth, 2023). The manifesto rightly critiques the limitations of mechanical approaches to human behavior, which often focus narrowly on cognitive processes while neglecting second-order effects (such as feedback loops), reducing behavior change to a linear causal pathway within a static setting. Such simplifications overlook critical factors like context and the dynamic environments in decision-making.

However, there is growing recognition of the need for a more nuanced synthesis of decision-making that accommodates multifaceted pathways and tracks the second-order effects of decisions (Schmidt & Stenger, 2021). The initial appeal of behavioral science lies in its promise of creating significant impact through small contextual tweaks. However, this approach now seems overly simplistic when faced with the complex, socially and psychologically intercon-

nected contexts that we, as applied behavioral researchers, regularly encounter in the field. Integrating a behavioral lens into systems thinking becomes invaluable in this real-world setting. By doing so, we can elevate our understanding of these issues, equipping researchers, practitioners, and designers with the tools needed to fully grasp the intricacies of human behavior and its interactions with the surrounding context. Only then can we design interventions that create large-scale and long-term impact and drive meaningful change by accounting for all the moving parts within the system.

Systems thinking: a comprehensive approach for behavioral science

Systems thinking offers a robust framework and versatile tools for understanding the elements that shape outcomes within a system. This makes it an ideal approach for designing environments that facilitate specific behaviors—a fundamental goal of behavioral science. This allows us to move beyond the limitations of conventional qualitative and quantitative tools, enabling us to tackle the complexity of human behavior within a systemic context.

This shift toward systems thinking represents a critical evolution in behavioral science, providing the methodologies needed to address the multifaceted challenges of our field.

Busara's commitment to evolving applied behavioral science

As part of our commitment to this evolution, we've published our methodology for merging these two disciplines, making it freely accessible to encourage broader adoption. Many of our current projects now incorporate a systemic approach to understanding issues and designing context-specific interventions to address the key elements necessary for facilitating behavior change. By leading this shift, Busara is setting the stage for a new era in behavioral science that is more robust, context-sensitive, and capable of delivering impactful, long-lasting solutions for the complex behavioral problems for which we all want to find solutions.

Our journey from applied behavioral science to applied behavioral systems

In the broader world of applied behavioral science and within our journey at Busara, we've increasingly recognized the importance of understanding behavior within its full context. Over the years, as we've addressed challenges in development, retail, and the financial sector—particularly in the Global South, where infrastructure and systemic issues are often deeply intertwined with behavioral problems—we've come to appreciate the need for a deeper exploration of the environments in which behaviors occur. This realization has led us to consider not just the direct influences on behavior but also the less obvious, interconnected factors that shape it within specific social groups and contexts i.e., systems thinking.

Systems thinking has long been a valuable tool in decision research, often applied through frameworks like game theory (Forrester, 1994; Meadows, 2008). Traditionally utilized in fields such as engineering or economics, its principles also naturally extend into behavioral science. However, systems thinking isn't just an enhancement to behavioral theories; it serves as a vital complement that deepens our understanding of decision-making processes within behavioral science.

Before moving to behavioral systems in its current form, it's important first to acknowledge the tools we've already been using at Busara. Though not systems tools by name, they've led us to consider the broader range of factors and actors that influence behavior, often in indirect or non-obvious ways.

Our journey from the current systems-like tools to behavioral systems reflects our commitment to learning, adapting, and embracing new perspectives to

better tackle the challenges we face. We believe many other organizations are also evolving their approaches, and this reflection may offer valuable insights for others who ask themselves, "How can I better understand human behavior?" By sharing our process, we hope to contribute to a broader conversation within the field, encouraging further refinement and collaboration as we collectively seek to deepen our understanding and drive more meaningful change.

Leveraging behavioral science tools for a more holistic, systems-inspired approach at Busara

At Busara, this evolving understanding has driven us to innovate and create practical tools that enhance the application of behavioral insights. These tools have become central to our work, guiding us through the complex problems we encounter. While they may not be explicitly labeled as systems thinking tools, they reflect similar principles, encouraging us to think holistically and consider the broader networks of influences at play. Some of the tools we will cover are:

1. Behavioral mapping
2. Behavioral profiles
3. Behavior change models/ frameworks
4. Contextual and on-the-ground visits/ work

In the following sections, we will outline how these tools have evolved within Busara and how they align with systems thinking principles.

Behavioral Mapping: A multidimensional tool for understanding behavior

Behavioral Mapping is one of the most effective tools we use to deepen our understanding of complex behavioral issues. Over time, the behavioral sci-

ence toolkit has expanded to include various approaches that enhance the depth and precision of our analyses. Behavioral Mapping, in particular, has become a core element in behavior change strategies (Wendel, 2013). These maps are visually engaging illustrations and powerful knowledge-sharing tools, and essential starting points for comparative analysis.

Behavioral maps allow us to examine the interconnectedness of behaviors within their broader context, identifying the complex dynamics that arise from the presence or absence of key informational and behavioral factors. This approach pushes us beyond simplistic linear correlations between behaviors and barriers, helping to uncover the systemic forces that shape individual decisions and outcomes.

Figure 3 illustrates one of the behavioral maps developed by Busara to improve the adoption of digital services for banks in Suriname. In this project, we aimed to increase the bank's digital payment infrastructure adoption. However, we soon realized that non-platform-related issues were the primary barriers preventing clients from using these tools. The behavioral map added several layers to each stage of the user journey, capturing both platform-related barriers and factors related to perception, knowledge, capacity, and context. This broader view allowed us to propose changes beyond the digital platform, such as adjustments in communication strategies at branches, the account-opening process, and the materials provided to new clients. We also introduced feedback and follow-up mechanisms to address barriers that arose outside of the platform.

Translating contextual, qualitative, and quantitative information into a behavioral map is a crucial part of the process, where principles of Systems Thinking come into play. Behavioral Mapping enables us to break down each behavior step into micro-behaviors—small, specific actions that cumulatively lead to a more significant outcome of interest. This detailed breakdown helps identify the primary behaviors and the small, often overlooked actions that may serve as key intervention points.

Variations in behavioral mapping

There are multiple approaches to Behavioral Mapping, depending on the project's objectives:

1. **Status quo behavioral map:** This approach maps out the current behaviors and identifies obstacles along the predetermined path. It's helpful in understanding the existing barriers preventing a desired behavior.
2. **Comparative behavioral maps:** By creating both a "status quo" map and an "ideal path" map, we can compare the two to uncover opportunities for intervention. This approach is instrumental in qualitative research, exploring potential behavioral shifts with participants.
3. **Outcome-driven behavioral maps:** This approach focuses on achieving a particular outcome, regardless of the behaviors driving it. By brainstorming different techniques (e.g., using a Starfish Diagram), we map multiple pathways and identify the most effective route to reach the desired outcome.

Behavioral Mapping also integrates well with quantitative data analysis, particularly in digital environments, where clickstreams and user journeys can be mapped to understand why users drop off at certain points. Each click or interaction is treated as a micro-behavior, and the map helps identify where interventions are necessary, similar to a marketing funnel analysis. On the qualitative side, behavioral maps allow us to ask open-ended questions, exploring how people move from their current behavior to a desired one, mapping out both the current state and the potential new pathways.

Evolving behavioral mapping tools

Behavioral Mapping has continued to evolve, adapting to the unique contexts in which it is applied. Tools like Process Maps and Service Blueprints have become integral to this evolution. While these tools are often two-dimensional, they encourage us to think in multiple dimensions by connecting behavioral

elements across a user's journey. This multidimensional perspective allows for a more nuanced understanding of behaviors and enhances the effectiveness of our interventions.

As illustrated in Figure 3, the behavioral map integrates multiple layers—behavioral, informational, and contextual—offering a holistic view of each step in the user journey. This broader perspective enables practitioners to address the visible barriers and underlying systemic issues that may hinder behavior change.

Behavioral Mapping compels us to move beyond direct, linear relationships between behaviors and their barriers. By applying principles of Systems Thinking, we can better understand the complex interplay of factors influencing behavior. This comprehensive approach leads to more targeted and effective interventions, allowing us to address behavioral challenges with greater precision and impact.
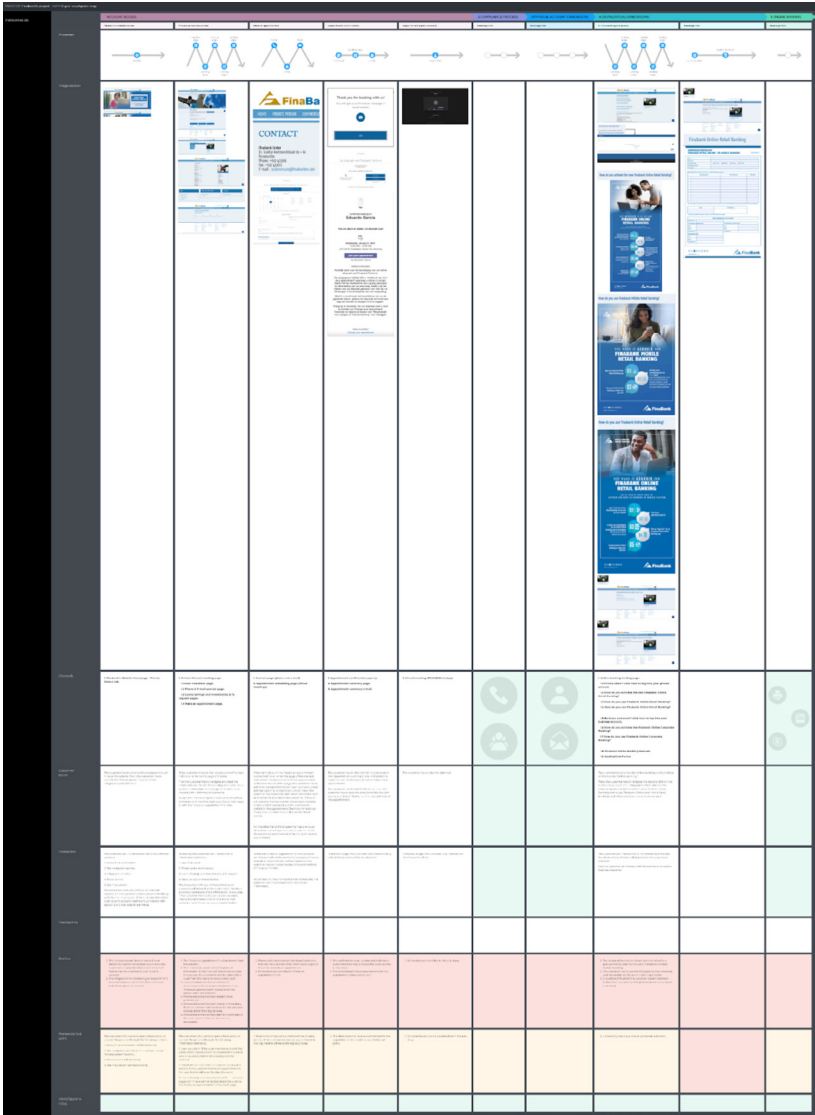
Figure 3: Behavioral map developed by Busara
for Finabank's Digital Services Adoption Project

TOUCHPOINT
Who is interacting with what, and what are they doing?

ACTOR
The humans involved in this step - could be the customer and/or supporting actor(s) who are visible or invisible.

SYSTEM
Technology, hardware, or processes that support this step.

OBSERVATION/FACT
A bit of a catch all - anything else you learn about this step that helps contextualize it, but doesn't fit neatly into another category.

METRIC/DATA
Data or metrics that help contextualize this step - such as time spent on this step, completion rate, or associated costs.

POLICY/RULE
Any policies or regulations that dictate how this step is, or must be, completed.

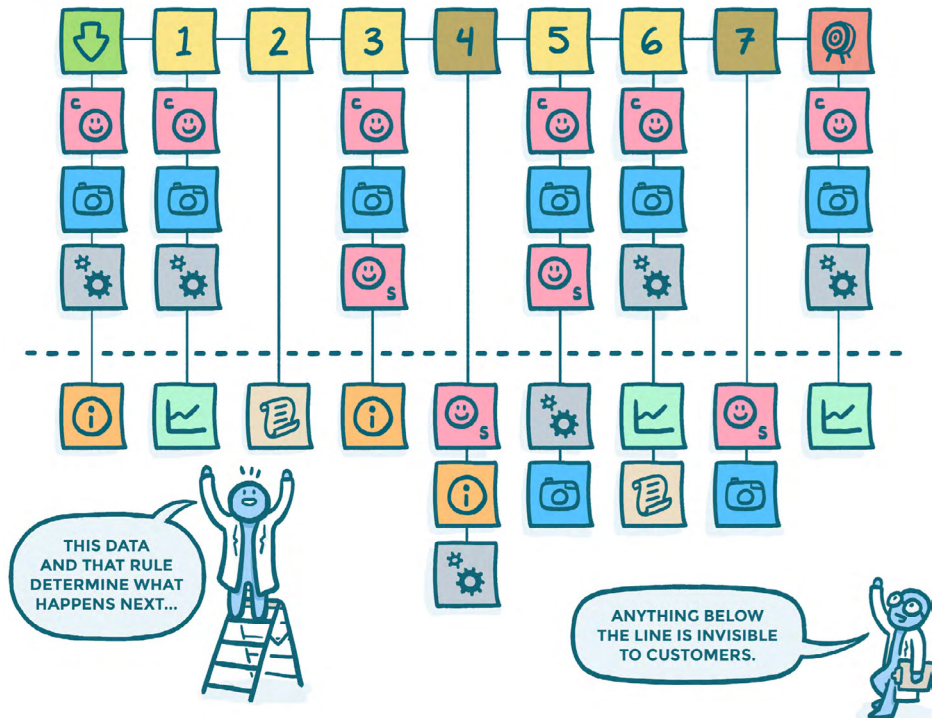**Figure 4:** A Simple Behavioral Map proposed by the behavioral mapping methodology proposed by The Center for Advanced Hindsight

Moving toward a development-oriented approach: behavior profiles

A recent and more development-oriented approach is the [Behavior Profiles framework proposed by Think | BIG](#), which forces behavioral scientists to try and understand the various steps required and involved in target behaviors. This framework also forces you to understand the multiple factors that prevent or support the practice of the behavior, the various actors that are or should be involved, and the various strategies that can be implemented to support or prevent the occurrence of the target behavior.

A **Behavior Profile** is a more anthropological tool that forces the researcher to focus on what matters most; changing critical factors to the priority behaviors and enabling the small steps needed to practice and support the behavior. Like the previous tools, it is not a formal or fully systemic tool. Still, it is a practical approach that showcases the need for behavioral research to focus not on one element of the problem but on all of it as a system of interconnected elements that need to be identified, understood, and eventually diagnosed and adjusted strategically.

BEHAVIOR PROFILE: ANTENATAL CARE

HEALTH GOAL	Health Goal: Improve maternal and child survival	
BEHAVIOR	Pregnant women complete a full course of quality antenatal care (ANC)	
	⌒ Indicator: Percentage of women who had a live birth in the three years preceding the survey who had 4+ antenatal care visits	

BEHAVIOR ANALYSIS			STRATEGY
BEHAVIOR AND STEPS	**FACTORS**	**SUPPORTING ACTORS AND ACTIONS**	**POSSIBLE PROGRAM STRATEGIES**
What steps are needed to practice this behavior?	What factors may prevent or support practice of this behavior?	Who must support the practice of this behavior, and what actions must they take?	What strategies will best focus our efforts based on this analysis?
			◄ *Strategy requires Communication Support*

Behavior Pregnant women complete a full course of quality antenatal care (ANC) **Steps** 1. Recognize signs and symptoms of pregnancy 2. Decide to seek ANC early, before the end of the first trimester 3. Plan transport, resources, and logistics 4. Attend all recommended ANC visits 5. Obtain all required services (history, examination, screening and tests, treatments, preventive measures, health education and counseling) from qualified provider at each visit 6. Adhere to provider instructions during and following each visit, including when to return for the next visit	**STRUCTURAL** **Accessibility**: Pregnant women cannot access health facilities because they are too far. **Accessibility**: Pregnant women do not attend multiple ANC visits because they struggle to afford the costs that come in addition to on-going essential expenditures. **Service Provider Competencies**: Pregnant women cannot obtain quality ANC because providers neither respect them nor effectively communicate relevant technical information or explain the benefits of the different services, tests, and medications given during ANC. **Service Experience**: Pregnant women do not go for ANC because the health facilities often lack the tests, medications, or supplements that women need, or payment is required when services and products should be free. **SOCIAL** **Family and Community Support**: Many pregnant adolescents and unmarried women are reluctant to seek early care because of stigma or the risk that they will be asked to leave school or quit their job. **Family and Community Support**: Pregnant women do not plan to attend, or attend ANC because family and community members do not encourage or support their attendance. **Norms**: Pregnant women do not seek ANC because many societies have strict cultural or traditional practices around disclosure of pregnancy. **INTERNAL** **Attitudes and Beliefs**: Pregnant women do not always perceive a value to multiple ANC visits if they have already had one or more healthy pregnancies. **Attitudes and Beliefs**: Pregnant women do not always comply with provider's instructions particularly related to medications, supplements, or foods because of beliefs about the adverse effects of the medication or foods on their fetus. **Knowledge**: Most pregnant women attend at least one ANC visit because they understand its benefits.	**INSTITUTIONAL** **Policymakers**: Ensure pregnant adolescents can still attend school. **Policymakers**: Ensure maternity care is accessible via insurance schemes, conditional cash transfers (CCTs) or other financing. **Managers**: Provide effective supervision and on-site support to ensure quality ANC services. **Logistics Personnel**: Monitor and properly forecast stock of essential tests, medicines, and supplements. **Providers**: Offer counseling and support to pregnant women during ANC visits, including thorough explanations of services provided as well as the importance of multiple visits and adherence to supplements or medications given. **COMMUNITY** **Community and Religious Leaders**: Publicly support or promote ANC including programs that attempt to reduce stigma and encourage women to talk to their partners about early pregnancy care. **Community Health Workers/Peer Educators**: Encourage or actively support women to seek a full course of ANC and to continue following provider's instructions once at home. **HOUSEHOLD** **Family Members**: Actively participate in ANC and support women, especially first-time mothers and adolescents, in all aspects of pregnancy and delivery planning. **Male Partners**: Actively support finances, planning, and transportation for ANC for pregnant women.	**ENABLING ENVIRONMENT** **Financing**: Finance task-shifting and explore community-based service delivery such as iron and folic acid supplements. **Financing**: Expand free or low-cost access to products and services through vouchers or fee exceptions to ensure access to ANC. ◄ **Policies and Governance**: Establish a policy for areas with poor health facility access to have the most basic ANC services, such as iron and folic acid supplement resupply managed at the community level. ◄ **Policies and Governance**: Adopt and enforce policies to permit pregnant adolescents to attend school. ◄ **SYSTEMS, PRODUCTS AND SERVICES** **Supply Chain**: Strengthen supply chains for essential drugs, supplements, and preventative medicines for ANC. **Quality Improvement**: Ensure that services are client- and family-friendly and that counseling on follow-up care is provided to both the pregnant women and any family members accompanying her. ◄ **Quality Improvement**: Expand services and improve structures, including hours offered, types of services available, transparent costing of services when appropriate and use of ANC outreach services to encourage pregnant women to use ANC. ◄ **Quality Improvement**: Train and support providers to emphasize value of completing all ANC visits as well as active birth planning. ◄ **DEMAND AND USE** **Communication**: Create pregnancy and new-mother groups to help mothers understand the benefit of care throughout pregnancy and the post-partum period. **Communication**: Use targeted media, including SMS where possible, to send tailored reminders and tips for pregnant women and their families on both ANC attendance and adherence to supplements like iron and folic acid. **Collective Engagement**: Train and use traditional leaders and traditional birth attendants to encourage women to seek early and multiple ANC visits.

Figure 5: Example Behavior Profile
- ANTENATAL Care (ANC)

For example, Busara worked on the **Sugar Dating project: an investigation of "sponsorship in Kenya,"** where we faced the complex task of understanding the elusive and stigmatized topic of sponsorship relationships. Through a combination of self-reported data, observational techniques, and incentive-compatible experiments, we constructed comprehensive behavioral profiles of the 252 female university students who participated. We gained valuable insights into the perceptions, attitudes, and social norms surrounding these transactional, intergenerational relationships by integrating quantitative, experimental, and qualitative methods.

The **Behavioral Profiling** in this study proved essential for unraveling the complex dynamics. It revealed that sponsorship relationships, although prevalent, are highly stigmatized, with significant discrepancies between self-reported data and actual prevalence due to social shame and underreporting. The research further showed that sponsorship was not linked to a specific psychological profile, underscoring the multifaceted nature of the behavior. Instead, factors such as peer influence, perceptions of anonymity, and societal norms were found to play critical roles.

These behavioral profiles deepened our understanding of sponsorship and provided a foundation for designing more effective interventions to reduce stigma and address the socio-economic drivers behind these relationships.

Behavior change frameworks and tools

One crucial tool to consider when approaching behavioral change is using Behavior Change Models or Frameworks, such as Steve Wendel's CREATE model (see Figure 6) and Susan Michie et al.'s COM-B model (see Figure 7). These widely adopted frameworks guide the behavioral design process across various domains, including product development, services, and public policy (Michie, Atkins & West, 2014; Wendel, 2013). They focus on key elements of human decision-making while encouraging practitioners to consider

broader contextual factors like knowledge, capacity, and opportunity, which are essential for individuals to adopt new behaviors.

While these frameworks are not fully systemic, they reflect practical ways in which behavioral science has incorporated dynamic analysis to enhance the effectiveness of interventions. For instance, Wendel's model emphasizes ability and time pressure, while Michie's model highlights capability and opportunity. These frameworks urge a more holistic approach by considering the broader context in which behaviors occur, recognizing that factors beyond the immediate behavior often influence decisions.
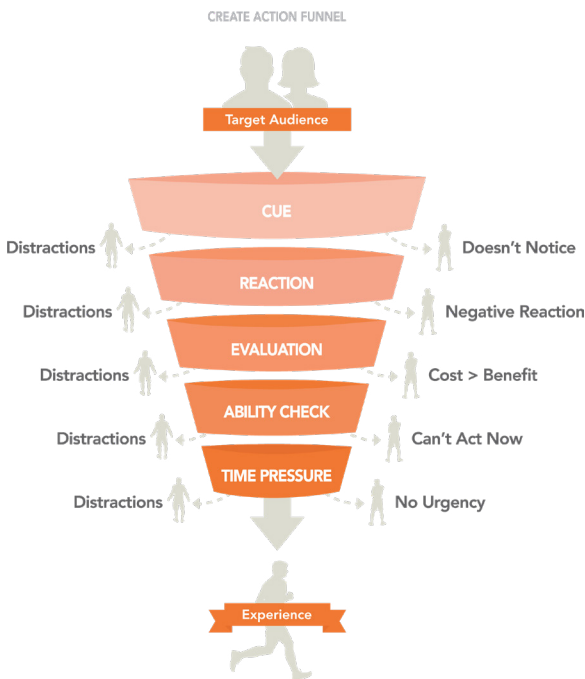
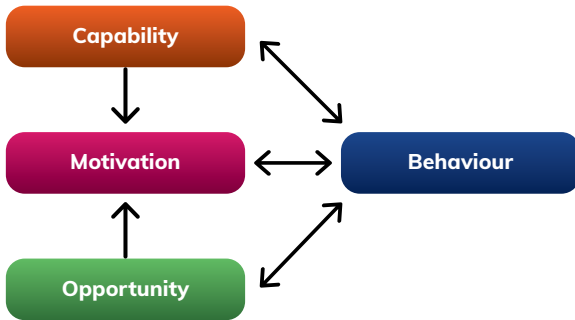**Figure 6:** Steve's Wendel CREATE Action Funnel by Useman on Medium

Figure 7: The COM-B Model
for Behavior Change

The evolution of behavioral change frameworks

In the past decade, applied behavioral science has rapidly evolved from relying on only a few conceptual tools to offering an array of frameworks and models. These frameworks guide and standardize approaches to problem-solving, making it easier to communicate the steps, inputs, and outputs required for successful interventions. They also clarify stakeholder responsibilities and timeframes, offering a structured pathway to achieving desired behavior change outcomes.

Process frameworks, such as COM-B, provide a clear, repeatable method for solving behavioral challenges. This approach differs from generic problem-solving methods by focusing specifically on changing behaviors, building on a foundation of empirical evidence from disciplines like behavioral economics, cognitive psychology, sociology, and anthropology.

Other process frameworks include Wendel's CREATE model, which examines Cue, Reaction, Evaluation, Ability, Timing, and Experience to explain how be-

haviors unfold. These frameworks provide essential tools for diagnosing behavior barriers and designing interventions that address the root causes of behavior.

Behavioral frameworks like COM-B have been beneficial in international development. Given the diverse and often challenging contexts in which behavioral science operates globally, these frameworks ensure practitioners account for local cultural, social, and economic factors when designing behavior change strategies.

For instance, COM-B's emphasis on capability, opportunity, and motivation allows practitioners to diagnose the specific barriers to behavior change and apply targeted interventions that are both effective and scalable. These frameworks create a clear understanding of the behavioral landscape, ensuring that interventions are context-specific and actionable by integrating empirical research methods like surveys and in-depth interviews.

Adding these behavior change frameworks into our research and project strategy allows our teams to incorporate more holistic approaches, even without fully committing to a comprehensive behavioral systems methodology. By leveraging tools like COM-B and CREATE, we can design interventions that account for a broader range of contextual factors while maintaining the flexibility to address complex challenges. This enables us to deliver targeted, impactful solutions across different settings, ensuring that we consider both immediate behaviors and the broader environment in which they occur without always needing to engage in the more resource-intensive process of systemic analysis.

Integrating contextual research with systems thinking for robust behavioral science

While systemic analysis offers a multi-layered perspective, its true potential is only realized when paired with contextual visits and fieldwork, as we have

experienced firsthand at Busara. These elements are not optional add-ons but fundamental components of our methodology. By immersing ourselves in the environments where behaviors occur, we can fully grasp the stakeholders' roles, the systemic dynamics at play, and the real-world impact of potential interventions.

In our work on Gender-Based Violence (GBV) in Guatemala, for example, systems thinking helped frame the challenge, but the deep, context-rich insights came from fieldwork. This blend of theory and hands-on experience allowed us to design theoretically sound and practically viable interventions. Through this dual approach, we gather insights that are often missed during desk-based research alone, ensuring that our interventions are both robust and contextually relevant.

The key lies in recognizing that straightforward approaches can be integrated with more complex, systemic methods. As Figure 9 shows, the interaction between context and intervention is emergent, meaning the systemic understanding gained from fieldwork often reveals hidden dynamics crucial to designing effective behavior change strategies. Busara's commitment to contextual research ensures that our behavioral science tools do not operate in isolation but are applied in real-world environments, making them impactful and sustainable.
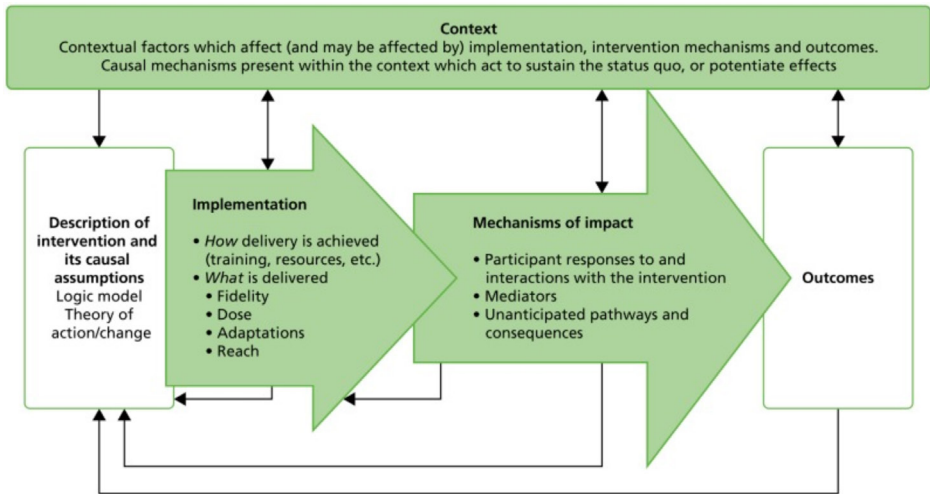
Figure 8: Represents the complexity and emergent nature
of the interaction between context and intervention

In summary

The evolving landscape of behavioral science calls for a shift beyond linear cause-and-effect models towards a more integrated, systems-based approach. By incorporating systems thinking into behavioral science, we can better capture the intricate web of factors influencing decision-making, allowing us to design more comprehensive, context-sensitive interventions. This shift is necessary to address the credibility crisis and limitations of the field and tackle the complex behavioral challenges encountered in diverse real-world settings. As we move forward, it becomes increasingly clear that the future of behavioral science lies in this marriage of traditional insights with systemic, context-driven methods, creating a robust framework capable of delivering sustainable, large-scale impact.

Merging linear and non-linear approaches in behavioral science

While linear methods may sometimes seem less comprehensive than formal systemic approaches, they remain essential tools in applied behavioral science. Rather than being inferior, these methods form the backbone of lean and agile techniques that deliver replicable, actionable insights. They help us break down complex behaviors into manageable components and are especially valuable in fast-moving or resource-constrained environments. However, the most profound understanding of human behavior emerges when we combine these linear approaches with non-linear, systemic thinking.

At Busara, we have been actively evolving our methods to integrate these cutting-edge tools. Through continuous learning, testing, and adaptation, we aim to go beyond traditional approaches to address the complex behavioral challenges we face, particularly in the Global South. We have found that while linear tools can generate significant insights, our deep contextual engagement—viewing challenges from the perspective of Global South researchers, designers, and scientists—truly sets us apart. We uncover the hidden dynamics and systemic barriers that must be addressed to create meaningful change by embedding ourselves within these environments.

This journey has led us to fully embrace the behavioral systems approach fully, marking significant evolution in how we tackle the challenges of behavior change. We can scale our analysis as needed, applying quick insights for immediate interventions while leveraging systemic approaches to dive deeper into the root causes of behavior by recognizing that linear methods and systemic thinking are complementary. In doing so, we ensure that our work is more robust and tailored to the complexities of the environments in which we operate. This integration represents the next step in the evolution of behavioral science and enhances our ability to deliver impactful, sustainable solutions.

Case study: integrating behavioral systems thinking in Guatemala's gender-based violence response

A prime example of Busara's integration of linear and systemic approaches is our ongoing project addressing gender-based violence (GBV) in Guatemala. In collaboration with Palladium and USAID, we are working to understand the complex dynamics surrounding GBV in a country where victims face deeply entrenched systemic barriers that prevent them from accessing the support they need.

Guatemala grapples with a long history of patriarchal norms, deeply rooted in both cultural and institutional structures, which have perpetuated high rates of GBV. This situation is exacerbated by weak enforcement of GBV policies, widespread corruption, and systemic failures in the healthcare and legal systems. Women, particularly those in rural and Indigenous communities, face significant challenges when trying to access justice and healthcare. This context demanded a multi-layered approach that addressed behavioral barriers and the structural weaknesses embedded within the system.

From linear insights to systemic understanding

Initially, we applied traditional linear methods to break down the issue into manageable components. This involved mapping the pathways victims take within the healthcare and legal systems, identifying key stakeholders, and isolating intervention points where targeted support could improve outcomes for victims/survivors (V/S). These initial steps gave us valuable insights into how the system functioned at a surface level, revealing clear service breakdowns, from reporting violence to receiving medical care or legal support.

However, it soon became clear that a linear approach alone could not address the systemic complexity of GBV in Guatemala. While isolated interventions—

such as increasing reporting rates or improving service delivery at hospitals—yielded localized improvements, they did not tackle the root causes or mitigate unintended negative consequences, such as retaliation against victims. This realization led us to adopt a systems thinking approach, which allowed us to map out the interconnected feedback loops that reinforce adverse outcomes for victims across different areas of the healthcare and legal systems.

The impact of mandatory reporting: A case in point

One of the most significant challenges identified through this systemic lens was the unintended negative impact of mandatory reporting. While mandatory reporting is often seen as a best practice in many countries, it became evident that, in the Guatemalan context, it posed a serious risk to victims.

Mandatory reporting refers to legislation that requires healthcare providers or other designated individuals to report known or suspected cases of intimate partner violence to authorities. Though this policy is meant to safeguard victims, the lack of confidentiality mechanisms within the Guatemalan system means that reports often become known to perpetrators, putting victims at risk of retaliation.

Instead of increasing protection, mandatory reporting in its current form dissuades victims from seeking help due to fear of reprisal. This is especially true in rural and Indigenous communities, where social networks are tight-knit, and information about a report can spread rapidly, heightening the risks for those involved. The well-intentioned policy of mandatory reporting thus inadvertently feeds into a negative feedback loop:

1. **Lack of confidentiality** in mandatory reporting increases the risk of retaliation from perpetrators.
2. **This retaliation erodes trust** in the healthcare and legal systems, leading victims to abandon their pursuit of support.
3. **As fewer cases are reported,** the issue of GBV becomes less visible in

official data, resulting in lower prioritization of GBV by policymakers.
4. **This lack of visibility leads to reduced budget allocations** for GBV programs, further weakening the system's ability to protect victims and ensure confidentiality.
5. **The cycle continues,** with the system unable to provide the necessary protections, further driving abandonment and fear among victims.

Identifying Critical Negative Feedback Loops

Through our qualitative research and systems mapping, we identified more than nine negative reinforcing feedback loops that intersect at various points in the system and collectively contribute to the worsening conditions faced by V/Ss when they approach the health system. These feedback loops create a cycle of abandonment, where victims disengage from the system, which in turn erodes any interventions made to improve it.

Some of the most prominent negative loops include:
1. **Lack of capacity to provide comprehensive care and support for Victims/Survivors (V/S)**
2. **Revictimization**
3. **Inefficient and out-of-context policies**
4. **Lack of allocated budget**
5. **Lack of official statistics on Gender-Based Violence (GBV)**
6. **No confidentiality in Victim/Survivor reports**
7. **Lack of capacity for comprehensive judicial support**
8. **Unimplemented protection measures**
9. **Number of convictions made by the system**

An example of a negative loop: lack of comprehensive care loop
A lack of a comprehensive care loop illustrates how systemic failures compound over time:

1. **The system's inability to provide one-stop centers,** culturally appropriate services, or compelling data transfers leads to more revictimization for V/Ss.
2. **This results in less confidence and trust in the system,** leading to abandonment.
3. **The issue becomes deprioritized and politicized** with fewer reports and data on GBV.
4. **This leads to reduced budget allocations,** weakening the system's capacity to provide the necessary support.
5. **The cycle repeats,** with the system unable to offer comprehensive care, driving more abandonment.

Integrating systems thinking: a community-based approach

Our work in Guatemala stands out because of its community-based approach, which integrates input from various policy levels, frontline workers, NGOs, doctors, and other key stakeholders. Throughout both the research phase and the intervention design process, the collaboration with these stakeholders has been crucial in maintaining a focus on improving the system as a whole.

Engaging community actors—from policy designers to healthcare workers and GBV victims themselves—has been key in ensuring that the interventions are locally relevant and sustainable. By incorporating insights from those who experience and address GBV on the frontlines, we have been able to diagnose the system's weaknesses and collaboratively design interventions that have the potential to create lasting change.

Aligning qualitative insights with systemic model outcomes

A critical element of our process has been aligning our qualitative research with the outcomes of the behavioral systemic model. The qualitative insights we gathered through extensive community-based meetings, interviews, and

focus groups validated the findings from our Agent-Based Model (ABM). This alignment has given us the confidence to move forward into the intervention design phase, knowing that our proposed solutions are grounded in both the lived experiences of V/Ss and rigorous simulation results.

Policy simulations: what worked and what didn't

The ABM allowed us to simulate 29 different policy interventions, ranging from improving access to social services, implementing rape kits in hospitals, and providing culturally appropriate care for Indigenous women. Some key findings included:

High-impact interventions:
- **Confidential reporting mechanisms:** Ensuring victims could report GBV without fear of retaliation had the most profound impact on improving trust in the system, increasing reporting rates, and empowering victims to seek help.
- **GBV education and response strategies:** Community education programs, particularly in schools, helped de-normalize GBV, creating long-term shifts in societal attitudes. When paired with better response strategies in hospitals, these interventions significantly improved the quality of care victims received.
- **Culturally appropriate one-stop centers:** Establishing centers where victims could access medical, psychological, and legal support in one location while ensuring confidentiality was critical for Indigenous and rural communities.

Negative-impact policies:
- **Hospital screening for violence:** While globally recognized as good practice, our simulation revealed that hospital screening without proper confidentiality protections exposed victims to increased risk of retaliation. Without secure reporting channels, screening alone worsened the situation for many victims.

Conclusion: The power of community-based systemic interventions

The ongoing project in Guatemala exemplifies the power of combining behavioral science with systems thinking. Integrating community-based insights has been critical to ensuring that the interventions are locally appropriate and that key stakeholders remain involved throughout the process. The identification of more than nine negative feedback loops highlights the profound systemic challenges that perpetuate cycles of violence and abandonment for V/Ss in Guatemala's health system.

At Busara, this project reinforces our belief that tackling complex social challenges requires both linear methods and systemic approaches. We are now moving into the intervention design phase, confident that the solutions we propose are backed by rigorous modeling and grounded in the realities of those affected by continuing to engage with local NGOs, doctors, policymakers, and frontline workers.

This behavioral systems approach represents a significant shift in how we address GBV, while offering a model for how holistic, community-driven solutions can generate long-term, sustainable change.

Reimagining social norms and information strategies through a systems thinking lens

Having explored the integration of behavioral science and systems thinking on a broader scale, we now turn our attention to more specific applications of these methodologies in social norms and information-based interventions. When applied to these domains, systems thinking reveals the complexity and interconnectedness underpinning behavioral changes in communities and social structures.

To illustrate this, let's compare a traditional linear approach towards understanding and working with social norms and a popular application of information-based interventions in the field versus a systems thinking approach. In real-world applications, these systems are often sub-components of a more extensive system, but they suffice to clarify the connection between Systems Thinking and Behavioral Science.

Moving the needle on social norms

Human beings are social creatures in that our decisions and behavior are often guided by what others around us do or expect us to do. In social psychology, this mechanism is conceptualized as social norms. Social norms are unwritten rules or expectations that guide individual behavior within a society (Cialdini, Reno, and Kallgren, 1990). They dictate what is considered acceptable or unacceptable behavior in various situations. These norms can be formal or informal and vary widely across cultures and communities. Behavioral science interventions often target social norms through interventions to enable change at the community level.

A linear approach: social norms in a simplified lens

When addressing social norms, a linear, traditional approach will tend to focus on identifying ways to intervene in the context, generally through providing information that will aim to directly challenge or even change a harmful norm, assuming that once individuals receive the correct information about what others are doing, their perception and/or behaviors will naturally change. This can be effective in straightforward cases but tends to oversimplify the complexity of social norms.

A linear approach would frame the problem as a simple input-output equation: provide the right message, and you'll get the proper behavior. The assumption is that human behavior operates in a vacuum, where individuals process information independently and make decisions based solely on the

content provided. While this works in controlled, individual-level scenarios, it doesn't account for the broader social context that influences behaviors on a collective scale.

For example, a campaign aiming to change attitudes toward gender equality might focus solely on distributing educational materials to shift individual beliefs. However, this approach fails to consider the intricate social networks, cultural norms, and feedback loops that reinforce existing behaviors. In such cases, even if individuals receive the new information, they may still adhere to the old norms due to the influence of their peers, local leaders, or institutions. A linear intervention may achieve only limited or temporary success without addressing these broader dynamics. Still, linear approaches have achieved good results when used to tackle specific behaviors, such as reducing stigma towards mental health issues (Bornstein and Languirand, 2009) and encouraging healthy eating habits (Robinson and Bales, 2009).

A systemic approach to social norms

Social norms are fundamental to human behavior, and their understanding inherently requires a systemic approach. Norms are dynamic and continuously reshaped through interactions within a community. These interactions influence individual beliefs and perceptions of what is socially appropriate or achievable. Therefore, studying social norms necessitates considering multiple layers of influence within a social system.

Understanding and influencing social norms inherently requires a systemic approach. Social norms are not static; they are dynamic and continuously reshaped through interactions within a community. These interactions can shift individual beliefs and alter perceptions of what is appropriate and achievable. In this context, a behavioral approach to social norms necessitates the consideration of multiple layers of influence that interact within a social system.

Research from **UNICEF** and the **University of Pennsylvania's Social Norms Group (PENN SoNG)** highlights the importance of understanding the individuals and groups forming community reference networks. These reference networks, which may not be immediately obvious to an outsider, play a crucial role in the communication, exchange of information, and influence among community members. We can identify key relationships and influencers integral to maintaining or changing social norms by mapping these networks.

For instance, **UNICEF** suggests that it is essential to map out the reference networks of individuals who engage in or are impacted by these practices to address harmful practices effectively. This involves identifying close-knit, influential relationships within the community, as well as broader connections that might not be as immediately apparent. Practitioners can better understand the social roles, emotional ties, economic exchanges, and demographic overlaps that contribute to the perpetuation or transformation of a norm by visualizing these connections.

This approach aligns with certain elements of **Systems Thinking,** which emphasizes the need to understand a system's interdependencies and feedback loops. Just as a systems approach would require mapping out the components and their interactions within a broader context, understanding social norms from a behavioral perspective requires a similar mapping of social networks and the various factors influencing them. Drawing these connections is not just an exercise in visualization but a critical step in designing interventions that are more likely to succeed because they are informed by the real, complex social dynamics at play.

While this is a solid and comprehensive approach to understanding social norms, it only scratches the surface of the complexities at play. To truly grasp the intricacies and dynamics of social norms, we need to adopt a behavioral systems approach. This method ensures that our understanding and interventions are not just focused on the individuals involved but also consider the broader social system in which these individuals exist. By taking this ho-

listic view, we can move beyond addressing isolated behaviors and instead target the underlying structures that support and perpetuate these norms. This deeper, systemic understanding leads to more effective and sustainable behavior change. Let's explore a more detailed example of how this works in practice.

Enhancing behavioral science with key systems thinking concepts

For readers interested in systems thinking, here is a basic primer on key concepts (Acaroglu, 2019):

- **System:** A network of connected elements which function together to generate a standard output or pattern of behavior. (Meadows, 2008) In a social science application of systems, these elements can consist of individuals, groups of people, institutions, etc.
- **Interconnectedness:** A vital property of any system, this refers to the interdependence and connections between different elements and underscores the shared pattern of behavior generated by the system. This concept is relevant to moving from a linear approach to human behavior to a more complex, multidimensional one.
- **Emergence:** An emergence refers to the creation of new and often unintended patterns of behavior that emerge from the interconnected actions of individual elements of the system, such as the emergence of new social trends on social media, which is often the result of the combined behavior of multiple social influencers. This is a useful tool to synthesize outcomes like unintended consequences of interventions in a system.
- **Feedback Loops:** These refer to pathways that move from a particular element to itself after moving through the system. These can be both reinforcing and balancing in nature. The spread of misinformation on digital media platforms is an example of a reinforcing loop where the more people share a misinformed post, the more likely it becomes for the next person to share the post, leading to a highly amplified false message.

Applying a systemic lens to social norms

Social norms are the unwritten rules that govern behavior in society. They emerge from individuals' collective behaviors and attitudes within a group (UNICEF SBC Guidance). Behavioral interventions often seek to influence or leverage norms to bring about change. Social norms can be represented as a complex system consisting of community members, the interconnectedness of different norms, the emergence of new norms, and feedback loops between actions of social referents and norm perceptions and propagation. Viewing norms as a system means recognizing that their propagation is influenced by various factors, including individual behaviors, social interactions, cultural context, and institutional influences. Social norms can have positive and negative effects on people's perceptions within a given context, and therefore, they exhibit mixed dynamics in response to any behavior change intervention. Within this context, the spread of social norms and their interactions with new interventions can be seen as a dynamic process where feedback loops, tipping points, and network effects play crucial roles.

Key components of the system

Individuals: At the core of social norm propagation are individuals who adopt and reinforce behaviors. Each person's actions and attitudes are influenced by their peers, family, and broader social networks. Personal beliefs and attitudes also influence whether someone accepts or rejects a norm.

Social networks: The connections between individuals form social networks, which are critical in the spread of norms. These networks can be friends, family, colleagues, or online communities. The structure of these networks—such as how tightly-knit they are and how information flows through them—affects how quickly and widely norms can spread.

Cultural context: The cultural background of a society provides the backdrop against which norms are propagated. Cultural values, traditions, and historical context shape acceptable or unacceptable behaviors. These cultural factors can either facilitate or hinder the adoption of new norms.

Institutions: Formal institutions, such as governments, educational systems, and religious organizations, can enforce norms through policies, laws, and education. These institutions often significantly influence what behaviors are promoted or discouraged in society.

Dynamics of Social Norm Propagation

Feedback Loops: Positive (reinforcing) and negative (balancing) feedback loops are fundamental in propagating social norms. Positive feedback occurs when the adoption of a norm by some individuals encourages others to follow suit, reinforcing the behavior. Negative feedback can happen when a behavior is met with resistance or punishment, discouraging its adoption.

Emergence: Social norm propagation often involves the emergence of new norms, where a critical mass of individuals or the 'right' individuals, i.e., change agents adopting a behavior, can lead to a creating and widespread acceptance of a new norm. The norm may spread slowly before reaching a tipping point, but the change can become self-sustaining once it is surpassed.

Interconnectedness: The very nature of social norms reflects a high degree of interconnectedness across and within elements. Social norms adherence is strongly informed by beliefs, attitudes, and normative perceptions, which are informed by experiences of oneself and of social referents.

Network Effects: The influence of social networks means that a few influential individuals' behavior can disproportionately impact the spread of norms. These key influencers can accelerate the adoption of norms within their networks and beyond.

Applications in the development context

Putting these elements together, we can consider a range of applications of systems thinking in applied behavioral science. A few ideas have been presented here:

- **Public health:** Understanding social norm propagation as a system can help design public health campaigns. For example, promoting norms around healthy behaviors, such as vaccination or smoking cessation, requires leveraging social networks and influencers to achieve widespread acceptance.
- **Gender equality:** Changing norms around gender roles and female participation in the workforce can significantly impact economic development. Systems thinking helps identify how cultural context, social networks, and institutional policies can collectively drive changes in attitudes and behaviors toward gender equality.
- **Sustainable practices:** Promoting sustainable agricultural practices and resource management in developing regions often involves changing long-standing norms. Systems thinking can aid in understanding how new practices can spread through social networks and be reinforced by institutional support.

In all applied scenarios, systems thinking can enhance (and not replace!) the effectiveness of behavioral economics interventions by considering the broader social context. For instance, programs designed to encourage saving, improve health behaviors, or increase productivity can be more successful when they account for the network dynamics of social norms and information provision that influence individual decision-making. Building on this, systems thinking coupled with a tool like agent-based modeling allows us to develop a strong understanding of the underlying behavioral ecosystem.

The concepts considered here were very simplified versions of a typical system. Busara follows a codified approach to creating a systems map strongly

rooted in qualitative research, iterative mapping, and validation. The Behavioral Systems Groundwork offers a detailed description of this process and considers multiple tools that can be used to study a system, such as agent-based models and network analysis. The idea (and hope) here is to leave you with the takeaway that system thinking offers a strong value proposition to enhance behavioral science and encourages you to consider adopting systems thinking in practice. In the short to medium run, behavioral systems are here to stay and can change the discourse of behavioral science for the better. In the long run, its success will be informed by the experiences of practitioners applying systems thinking in the field. Whatever results we find, will contribute to strengthening and developing behavioral science towards its next form.

References

1. Bornstein, M. H., & Languirand, J. (2009). The role of social norms in reducing stigma towards mental illness. *Journal of Social Issues, 65*(3), 523-545.
2. Boserup, E., Kanji, N., Tan, S. F., & Toulmin, C. (2013). Woman's role in economic development. Routledge.
3. Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling as the target behavior. *Journal of Personality and Social Psychology, 58*(1), 1015-1026.
4. Diaz Del Valle, Emiliano; Jang, Chaning; Wendel, Stephen. Behavioral systems: Combining behavioral science and systems analysis. *Busara Groundwork (Genre - Research Agenda), No. 8.* Nairobi: Busara, 2024
5. Forrester, J. W. (1994). System dynamics, systems thinking, and soft OR. *System dynamics review, 10*(2-3), 245-256.
6. Forrester, J. W. (1999). System dynamics: The foundation under systems thinking. *Sloan School of Management. Massachusetts Institute of Technology, 10.*
7. Meadows, D. H. (2008). Thinking in systems: A primer. Chelsea Green Publishing.
8. Robinson, T. N., & Bales, S. (2009). The role of social norms in promoting healthy eating behaviors among adolescents. *Journal of Adolescent Health, 45*(3), 232-238.
9. Social Norms. (n.d.). UNICEF Social and Behavior Change Guidance. https://www.sbcguidance.org/do/social-norms#:~:text=Social%20norms%20are%20the%20perceived,between%20behaviour%2C%20beliefs%20and%20expectations
10. Von Bertalanffy, L. (1972). The history and status of general systems theory. *Academy of management journal, 15*(4), 407-426.

About Busara

Busara is a research and advisory organization, working with researchers and organizations to advance and apply behavioral science in pursuit of poverty alleviation. Busara pursues a future where global human development activities respond to people's lived experience; value knowledge generated in the context it is applied; and promote culturally appropriate and inclusive practices. To accomplish this, we practice and promote behavioral science in ways that center and value the perspectives of respondents; expand the practice of research where it is applied; and build networks, processes, and tools that increase the competence of practitioners and researchers.

About Busara Groundwork

Busara Groundwork lays the groundwork for future research and program design. As think pieces, they examine the current state of knowledge and what is needed to advance it, frame important issues with a behavioral perspective, or put forward background information on a specific context.

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