Handwashing and the Science of Habit

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2 classic failures of behavior change…

1. Interventions change beliefs, but not behaviors (Webb & Sheeran, 2006).

2. Interventions change beliefs and behaviors, but behavior change is temporary and relapse occurs (Marteau et al., 2012)

…occur for handwashing too…

3. Knowledge/beliefs ≠ behavior change (Rabbi & Dey, 2013).

4. Short-term change ≠ long-term maintenance (Vindigni et al. 2011).

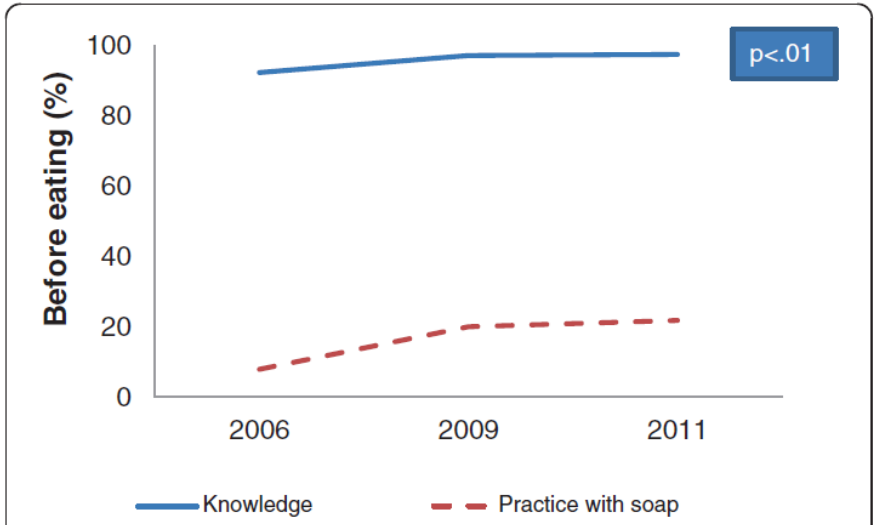


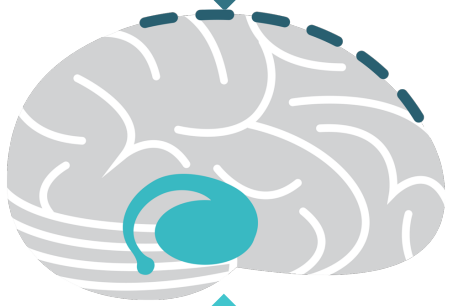
Figure 1 Knowledge and practice gap of hand washing before eating.

Rabbi & Dey 2013

Visual illusions as a metaphor – automatic mechanisms in the mind often “decide for us”…

WHY?
HANDWASHING INTERVENTIONS REQUIRES A "DUAL SYSTEMS APPROACH"

DRIVER	BRAIN SYSTEM	CHARACTERISTICS
Attitudes Intentions/ Goals Social Norms Rational benefits Emotions	System 2 – Mainly neocortex	"MENTAL ECONOMIST" • Fast to learn/slow to respond, effortful, conscious, outcome-driven…
Heuristics Habits	System 1 – Basal ganglia in interaction with neocortex	"MENTAL SATISFICER" • Slow to learn/fast to respond, effortless, automatic, cue-driven…



(Handwashing) interventions typically target here…

…and don't optimally tailor here

THE POTENTIAL GAIN?
HANDWASHING WILL BE HEAVILY INFLUENCED BY THE HABIT SYSTEM

Frequent context-stable behaviors involve…

Behavioral level

- Around 45% of daily life is “habitual” (Wood et al., 2002)

Cognitive level

- From declarative to procedural memory (Poldrack et al., 2001)
- Action chunking into ballistic sequences (Graybiel, 2008)
- Formation of cue-response links in memory (Neal et al., 2011)

Neural level

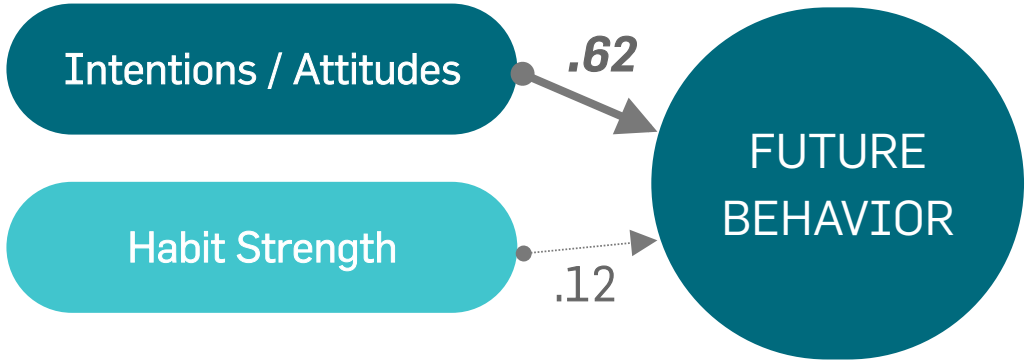
- Functional changes in the brain (e.g. Sakai et al., 2003)
- …and even structural changes (Draganski et al., 2006; Maguire et al., 2000)

THIS CHANGES THE DRIVERS OF ACTION & TARGETS FOR INTERVENTION

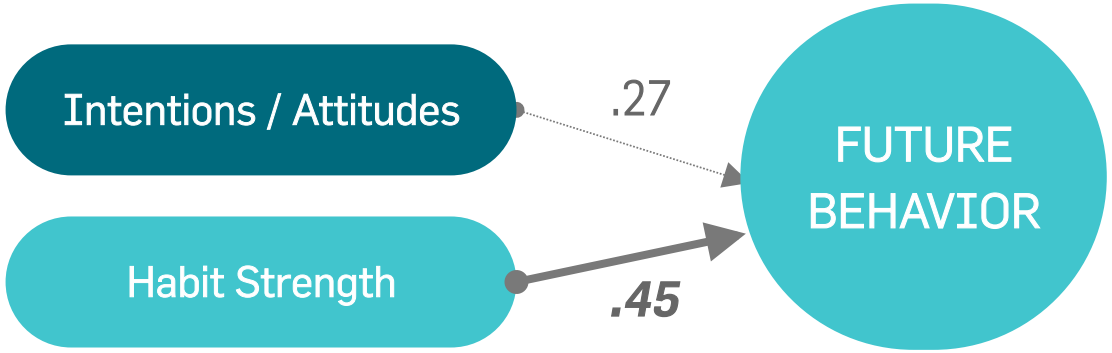
A. Behavior Prediction Meta-analyses:

Ouellette and Wood (1998). *Psychological Bulletin*

Things we do rarely or in different environments…



Things we do often and in the same environment…



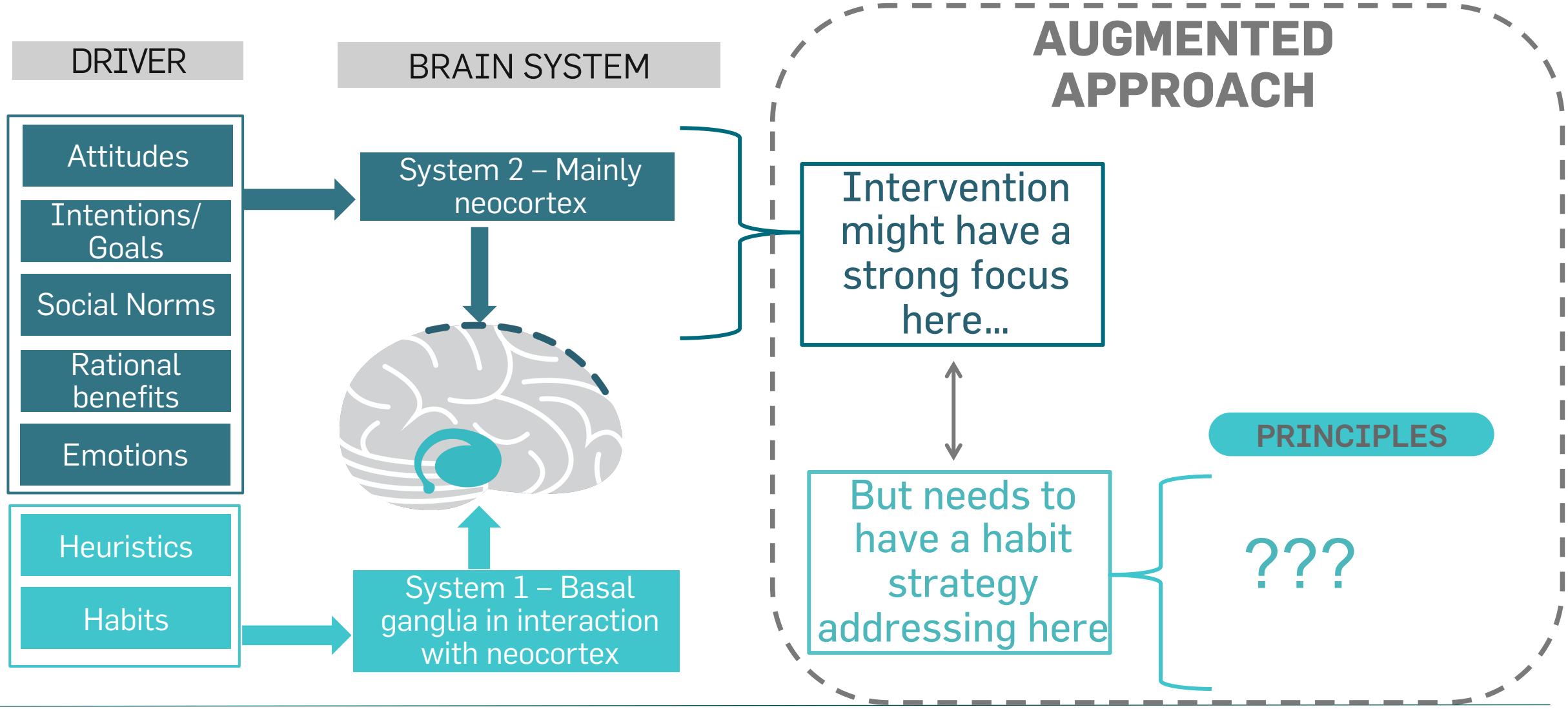
B. Do Intention-Based Interventions Change Behavior?

Webb & Shearan (2006). *Psychological Bulletin*

✓ Large effect,
Cohen's d = .77

✗ Small effect,
Cohen's d = .22

AUGMENTING EXISTING APPROACHES WITH A “HABIT STRATEGY”



TARGETING HABIT? 7 HABIT-FORGING PRINCIPLES

INTEGRATING FINDINGS FROM COG-NEURO, ANIMAL LEARNING, HEALTH PSYCH, SOCIAL PSYCH ETC.

PRINCIPLES	DEFINITION
1. Supporting Environment	*Supporting environments/products for new behavior must be immediately/ consistently available*
2. Leverage Context	*Leverage context by disruption or piggybacking on old behavior*
3. Eliminate Friction	*Eliminate choice, steps, and perceived effort*
4. Ownable Cues	*Create cuing ecosystem, ideally rewarded*
5. Accelerate Links	*Enhance cue-response learning*
6. Intervention through doing	*Foster procedural memory through doing*
7. Conscious Storytelling	*Encourage meaning-making around habit*

1. Supporting Environment

Supporting environments/products for new behavior must be immediately & consistently available

Basic science

- Habits are environmentally triggered. Critical environmental cues must be immediately available (without seeking/effort), or behavior won't occur unless motivation is extremely high (Wood et al., 2005).

Handwashing domain tactics

- Designated handwashing place with soap and water
  - In/near the latrine
  - In/near area food where is prepared/cooked
- Convenience, lack of materials where needed → commonly cited barrier
- When soap/water immediately available, compliance much higher (Luby, 2009)

Source: WASH Visual Aids Library

2. Leverage Context

Leverage context from old behavior via disruption or piggybacking

Basic science

- Context changes (e.g., moving) create window of opportunity to instill new behaviors (Verplanken, 2008). Interventions can be timed to co-occur.
- Alternatively, new behaviors can be paired with/piggyback on existing habits (Labreque, Wood, Neal, & Harrington, under review).

Handwashing domain tactics

- Timing interventions to occur when other major changes to physical/action environment have occurred.
  - Pregnancy/Motherhood as a potential teachable moment for handwashing (Greenland et al., 2013)
- Adding handwashing to list of good manners for school children (SuperAmma project).
- Adding mirror to wash station to “piggyback” on mirror-checking behavior.

3. Eliminate Friction

Eliminate choice, steps, and perceived effort

Basic science

- Choice is the enemy of habit formation (Wood & Neal, 2007)
- Even small perceived friction from new behavior can trigger relapse to old (Murray & Häubl, 2007)

Handwashing domain tactics

- Complexity of handwashing instructions (3-steps vs. 6-steps vs. 9 steps)
- Combining soap and water automatically
- Handwashing station is convenient to access

Source: www.who.int

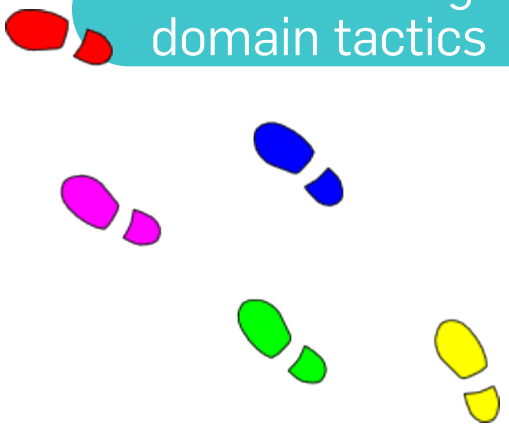
4. Ownable Cues

Create cuing ecosystem, ideally rewarded

Basic science

- Habit formation involves outsourcing control to context cues, which can be:
  - Visual cues in action environment (Neal et al., 2011)
  - Other actions (Graybiel, 2014)
  - Other people (Wood et al., 2005)
- If rewards are used, they should contain a mix of rewards that are immediate and tied to action, and rewards that are more cummulative or delayed (Yin & Knowlton, 2008)

Handwashing domain tactics



- Health improved among (intervention) children receiving cues (wall hangers, danglers) to wash hands and rewarded by mothers (stickers, coins) compared to the control group children (Nicholson et al. 2013).
  - Filthy or foul smelling hands
  - Pictorial cue cards placed in line of sight
  - Colored footsteps leading from latrine to wash station

5. Accelerate Links

Enhance cue-response learning

Basic science

- Cue-response learning can be “sped up” by implementation intentions - *“If x, then y”* associations in memory (Gollwitzer & Sheeran, 20006)

Handwashing domain tactics

- Glo Germ ™

- “Poo-tag” (SuperAmma)

6. Intervention through doing

Foster procedural memory through doing

Basic science

- Habit learning relies on procedural memory systems in the basal ganglia.
- Procedural memory is formed through trial and error engagement in the behavior; not through learning declarative/abstract “rules” (Poldrack et al., 2001).

Handwashing domain tactics

- Students wash hands with soap and brush teeth at school
  - Daily
  - As a group

7. Conscious storytelling

Encourage meaning-making around habit

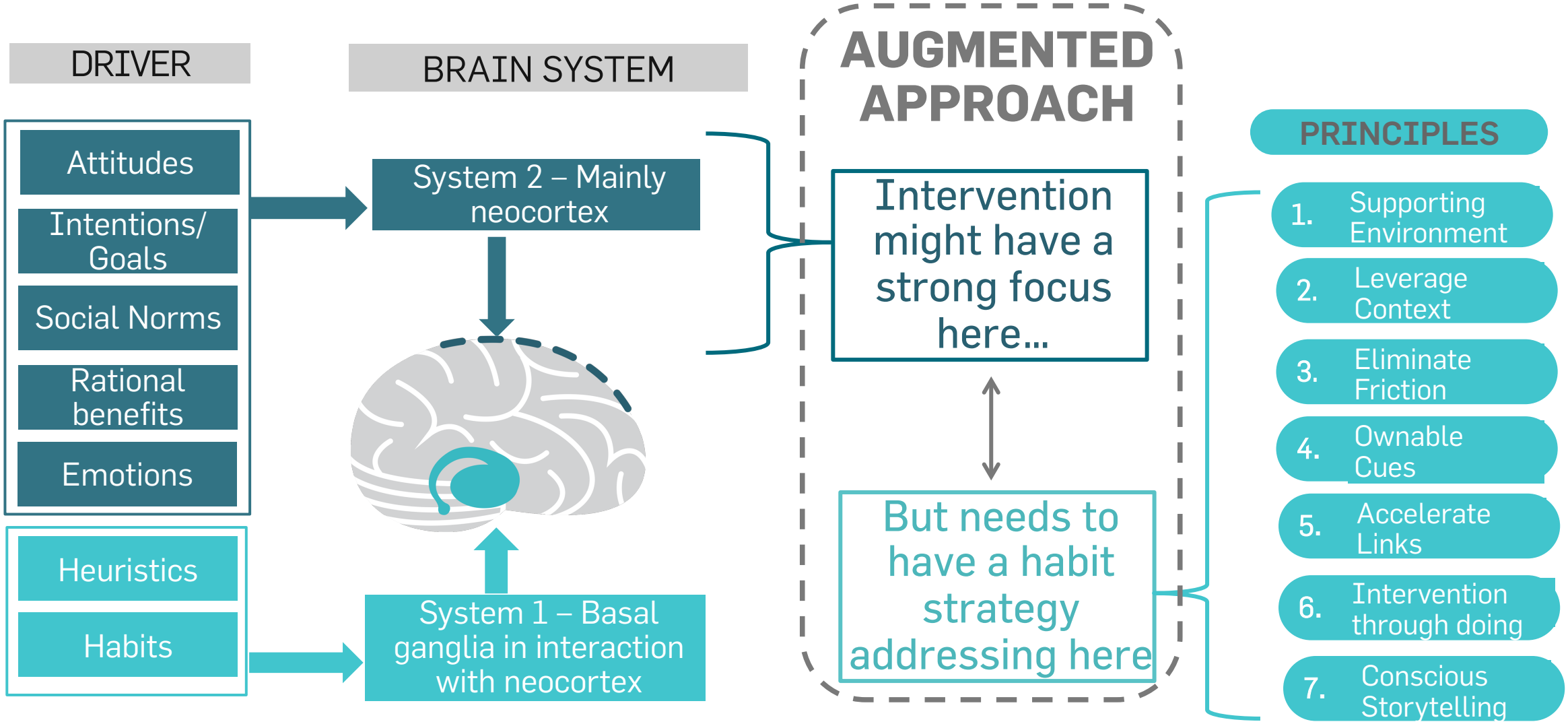
Basic science

- People infer their motives partly from observing their own behavior (Bem, 1967) including habits (Neal et al., 2011)
- Attributing meaning/motive/purpose to handwashing habits may:
  - Further prevent relapse
  - Promote advocacy – “spreading the habit”

Handwashing domain tactics

- “Good mums” club (Nicholson et al., 2013)
- SuperAmma or “super mom” (Biran et al., 2014)
- Women’s groups

CONCLUSION:
AUGMENTING EXISTING APPROACHES WITH A “HABIT STRATEGY”



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Further information?

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