



AI's place in Theories of Behavior Change:  
Long-term changes

# Theoretical Considerations

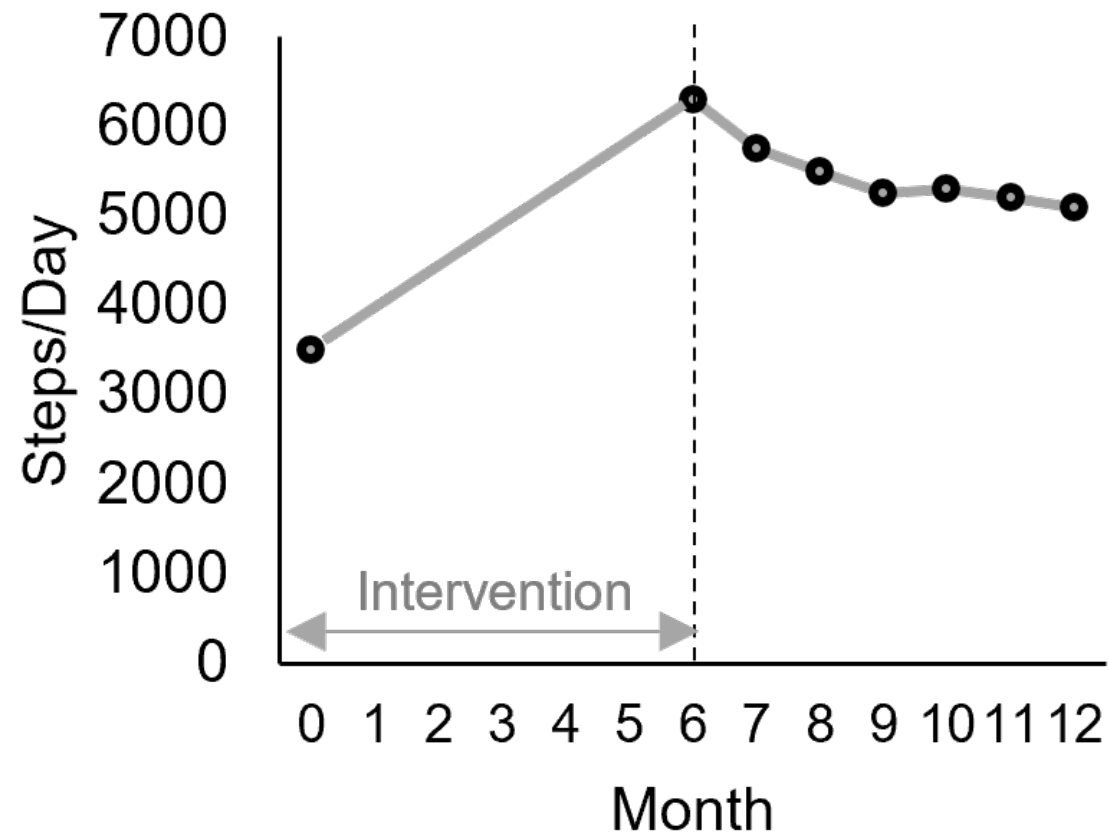
David E. Conroy, Ph.D.

[roybal.umich.edu](http://roybal.umich.edu)

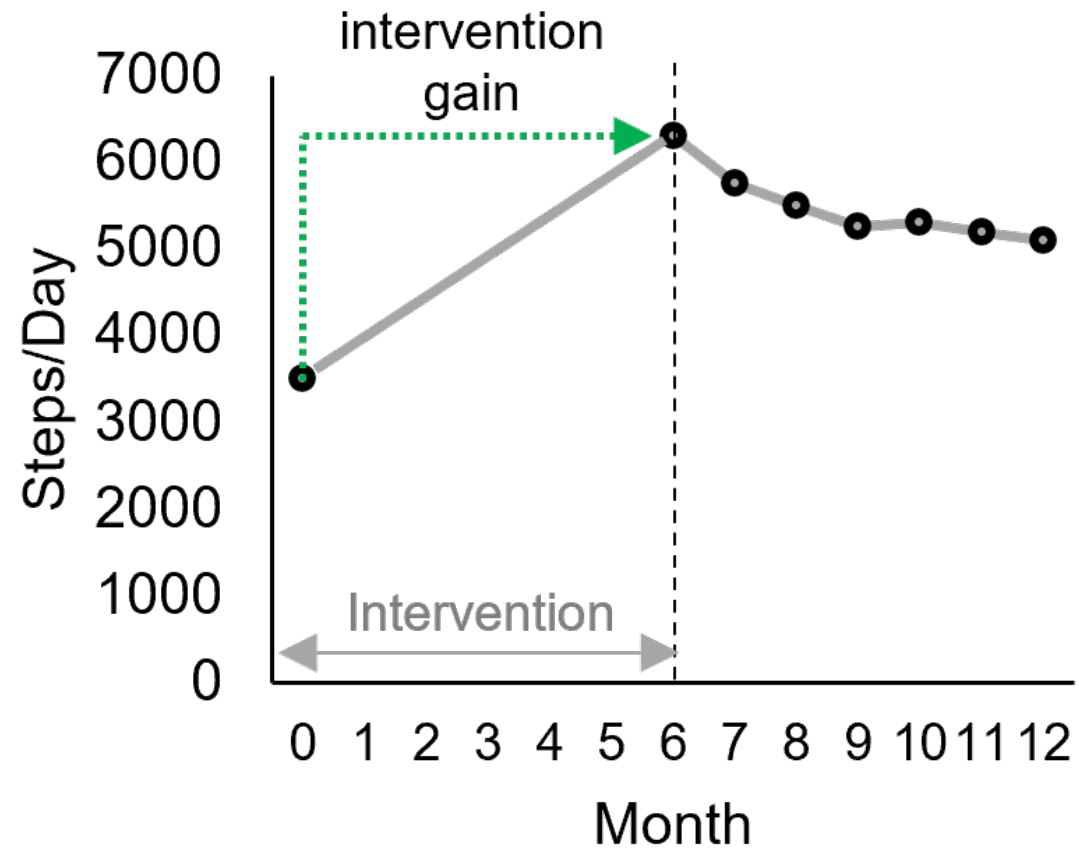
# Three theoretical considerations today

- 1 Post-intervention adherence likely has unique mechanisms of action that operate on slower time scales
- 2 Learning creates idiosyncrasies in behavior that may be impossible to detect with natural intelligence
- 3 Artificial intelligence can/will detect patterns for dosing and generate relevant content to engage targeted mechanisms of action

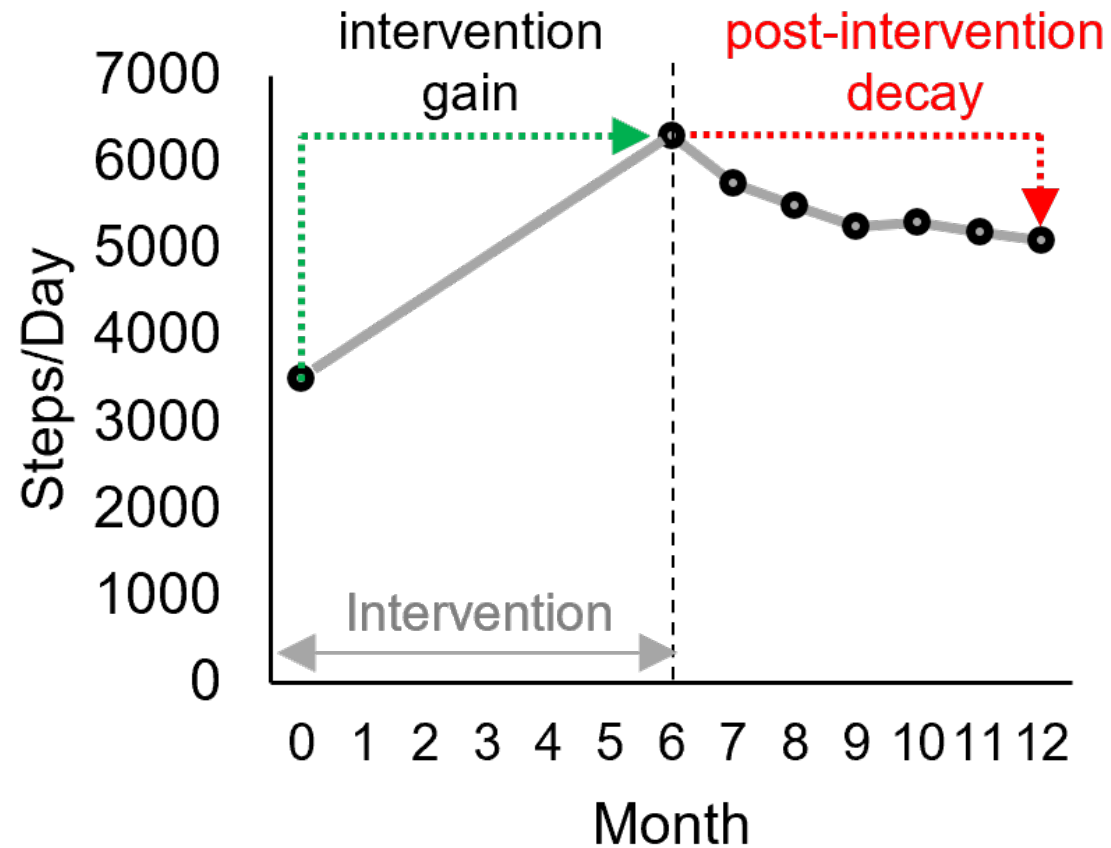
# Long-term behavior change is critical but vastly understudied



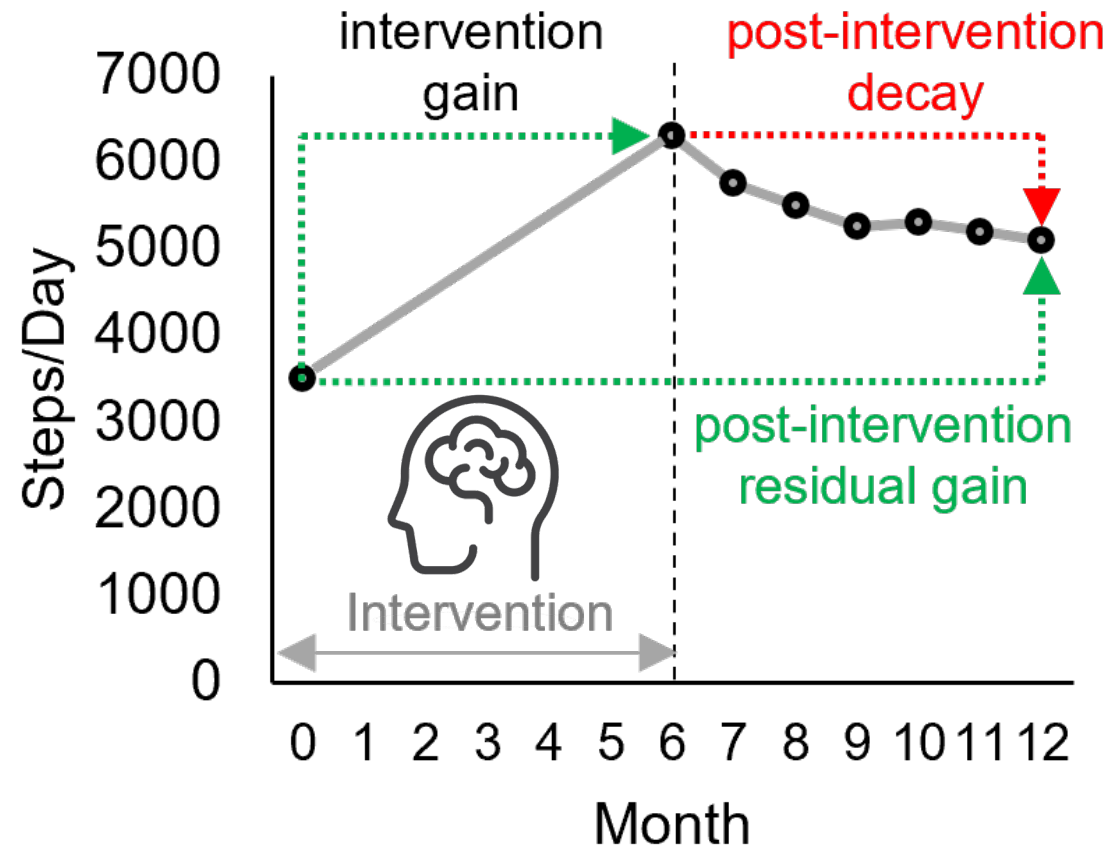
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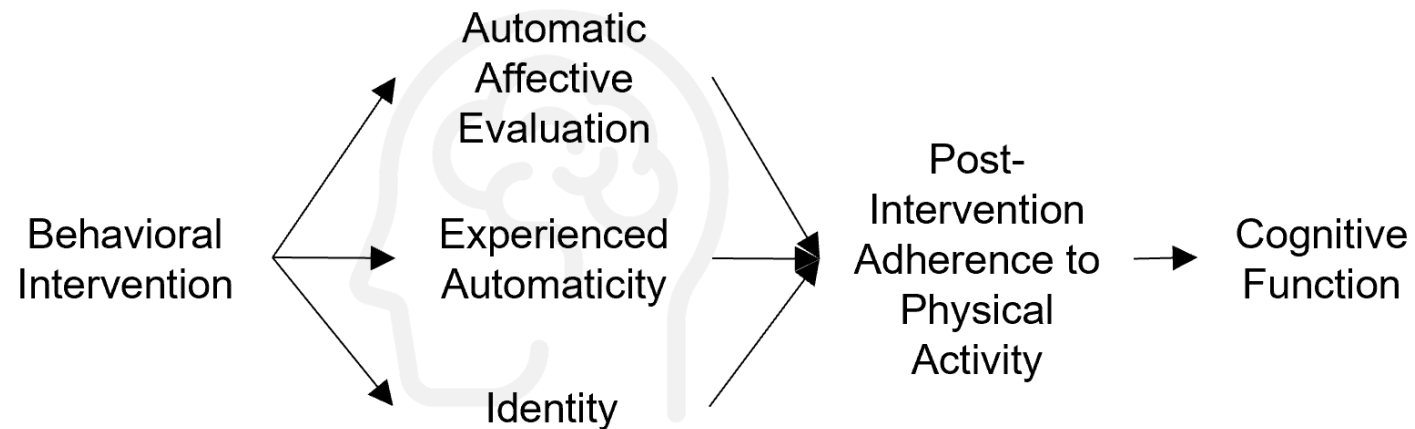
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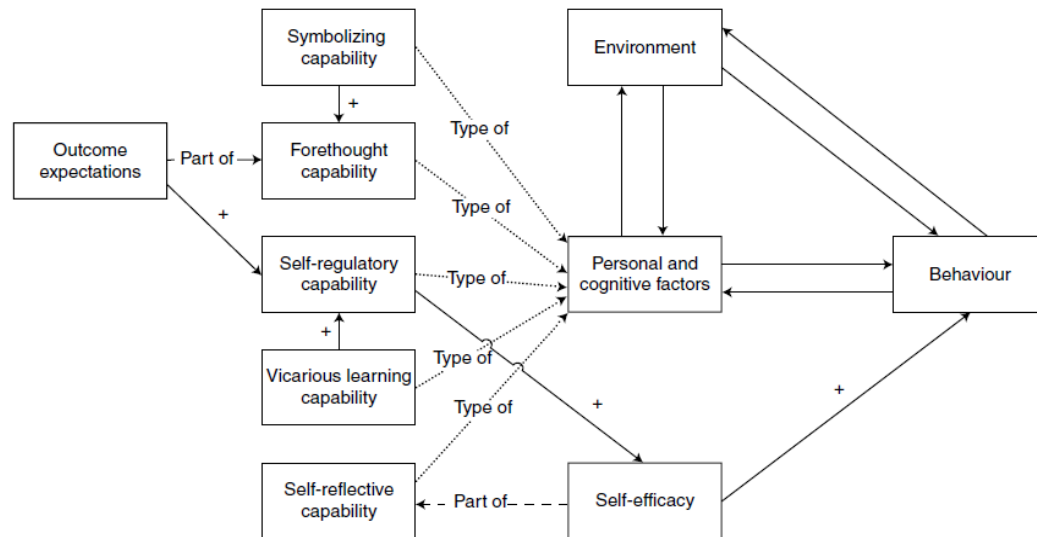
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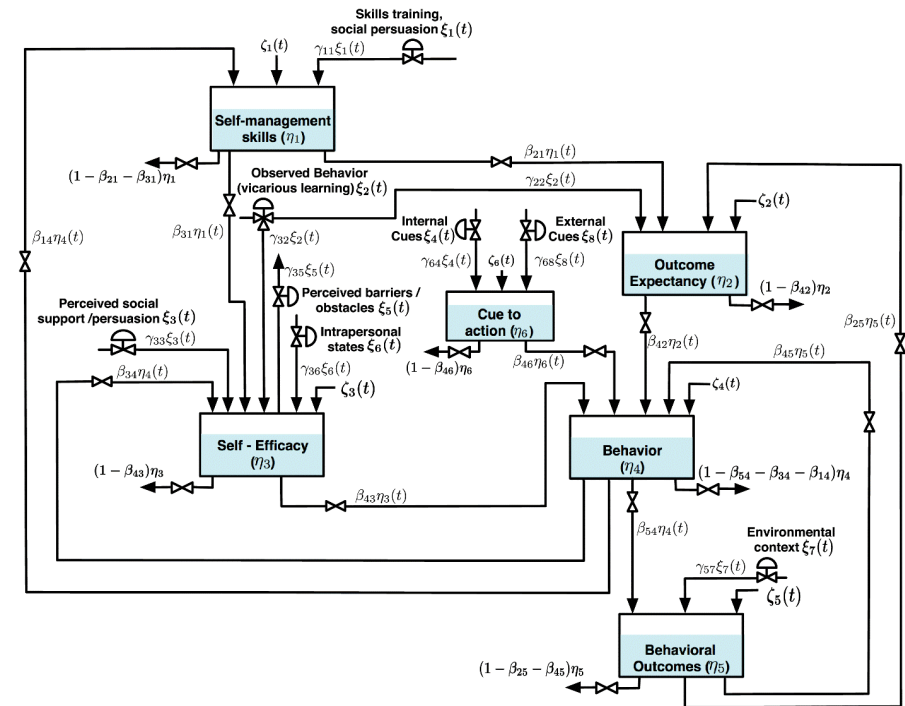
# Mechanisms of adherence likely differ from mechanisms of initial behavior change



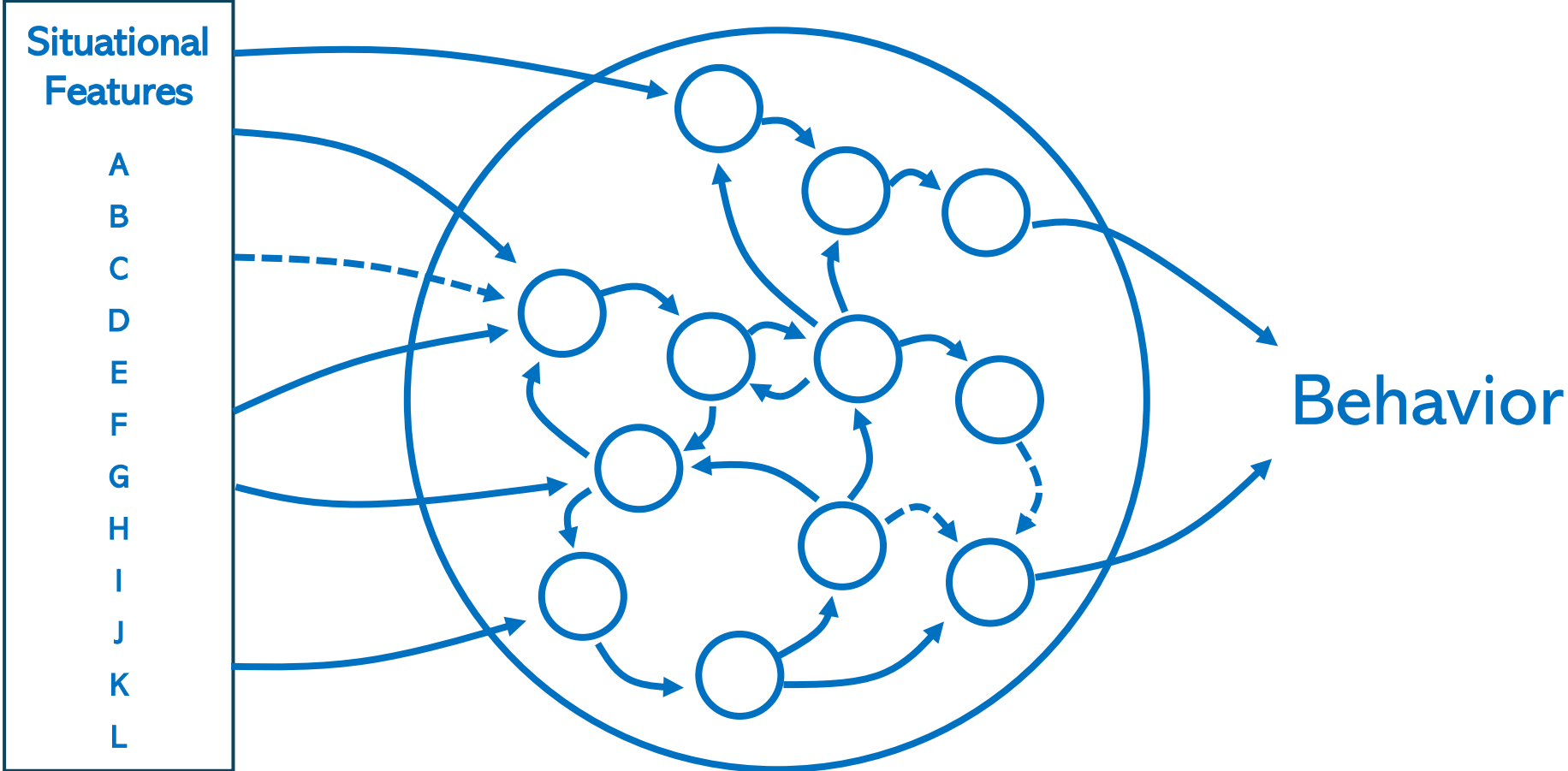
# Logically and mathematically formalizing a theory of behavior change forces precision



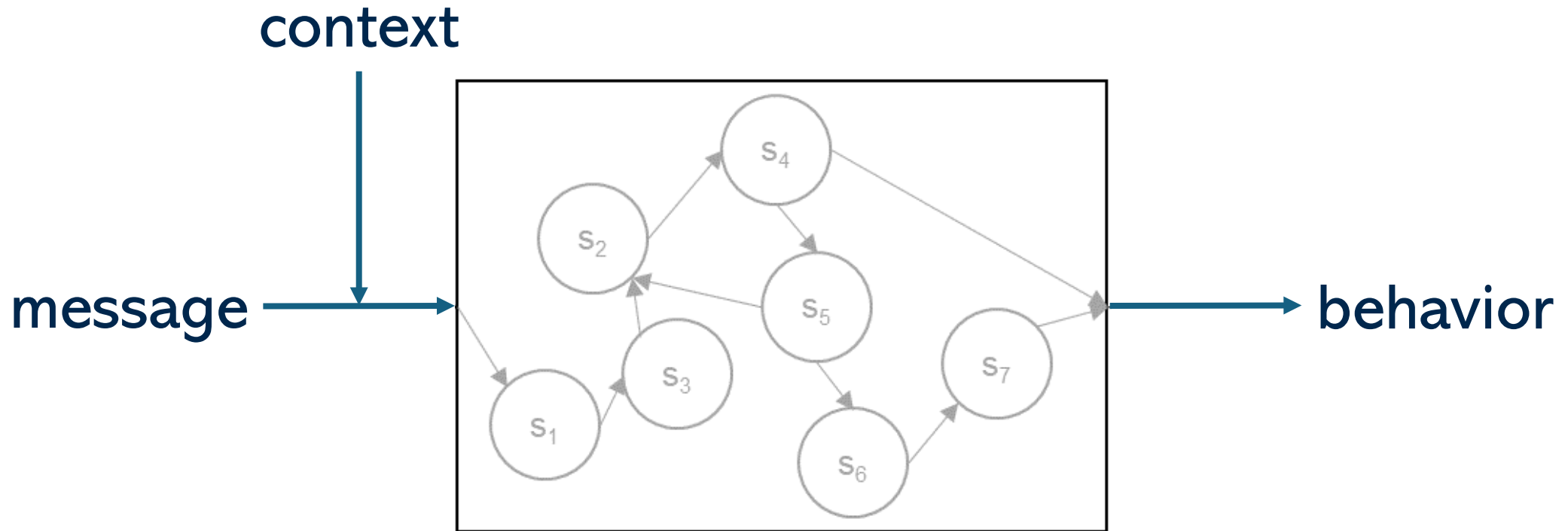
<https://www.humanbehaviourchange.org/>



# Situations activate idiographic cognitive-affective networks that organize behavior



# Messages can provide the situational stimulus that excites a system to elicit behavior change

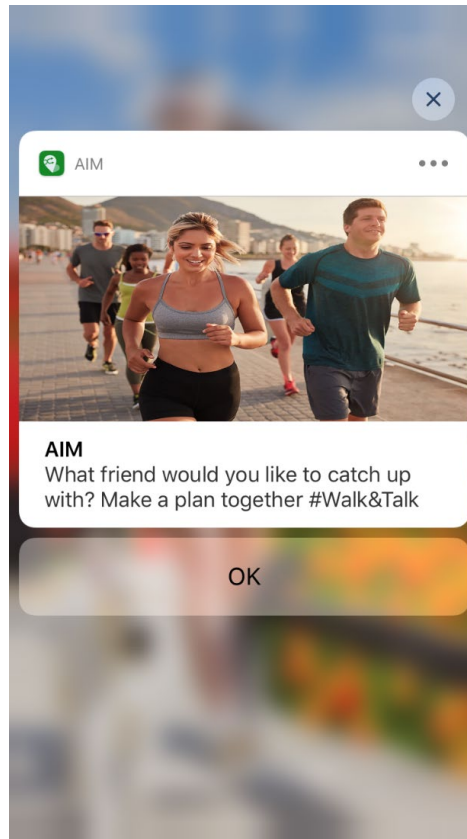


# Passive activity & location tracking + three message libraries

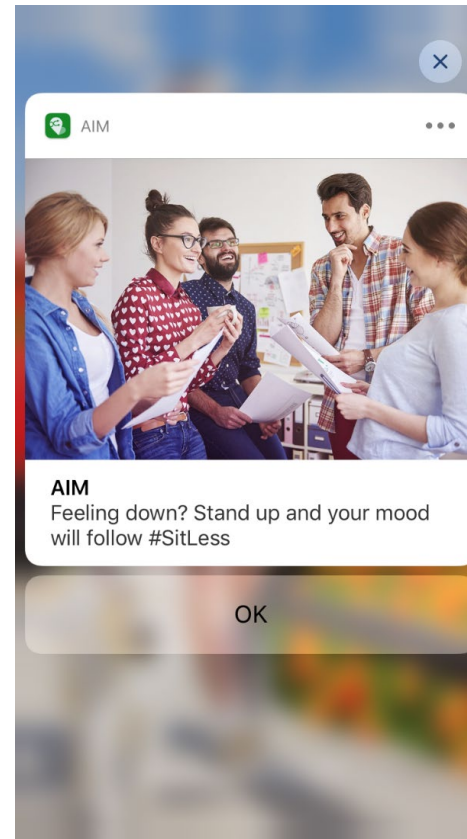


fitbit.

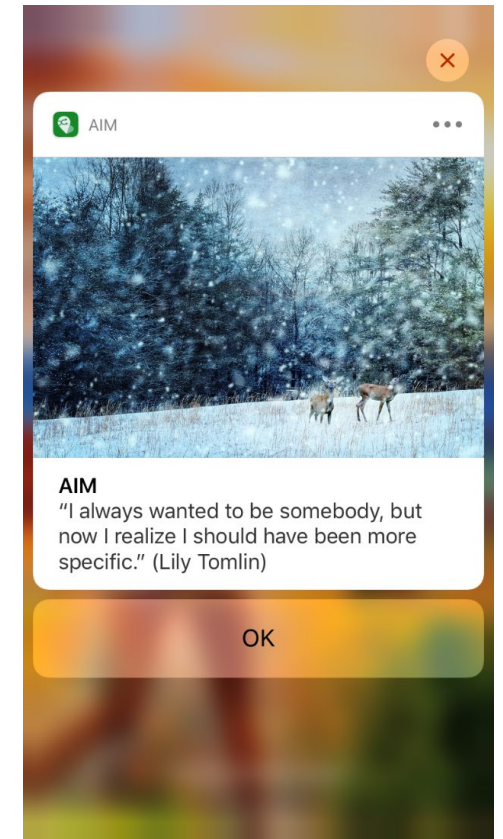
Move More



Sit Less

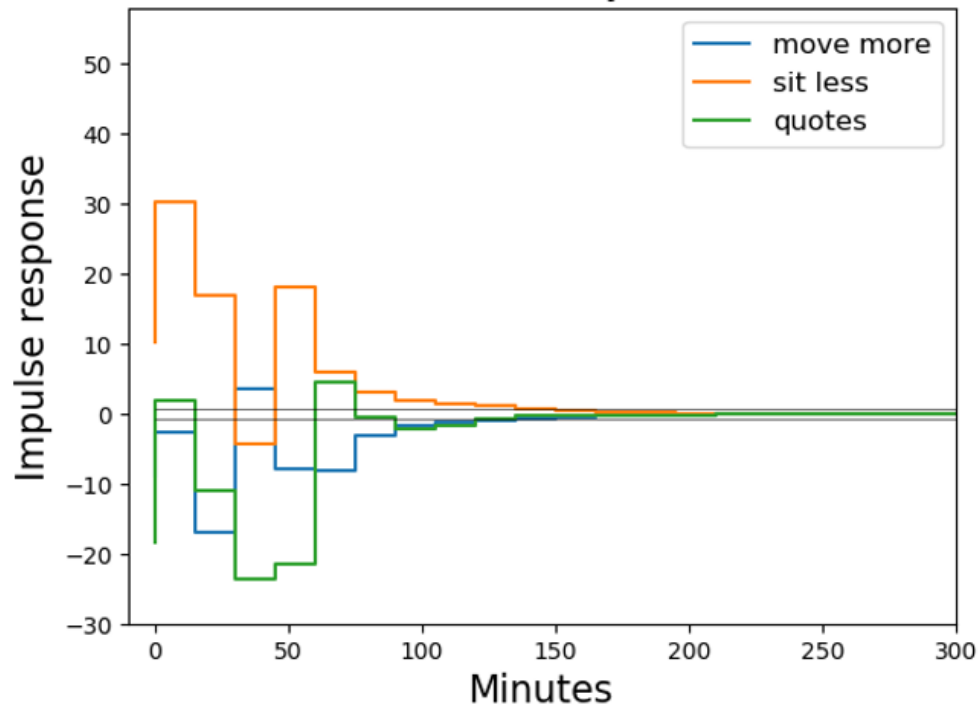


Inspirational Quotes

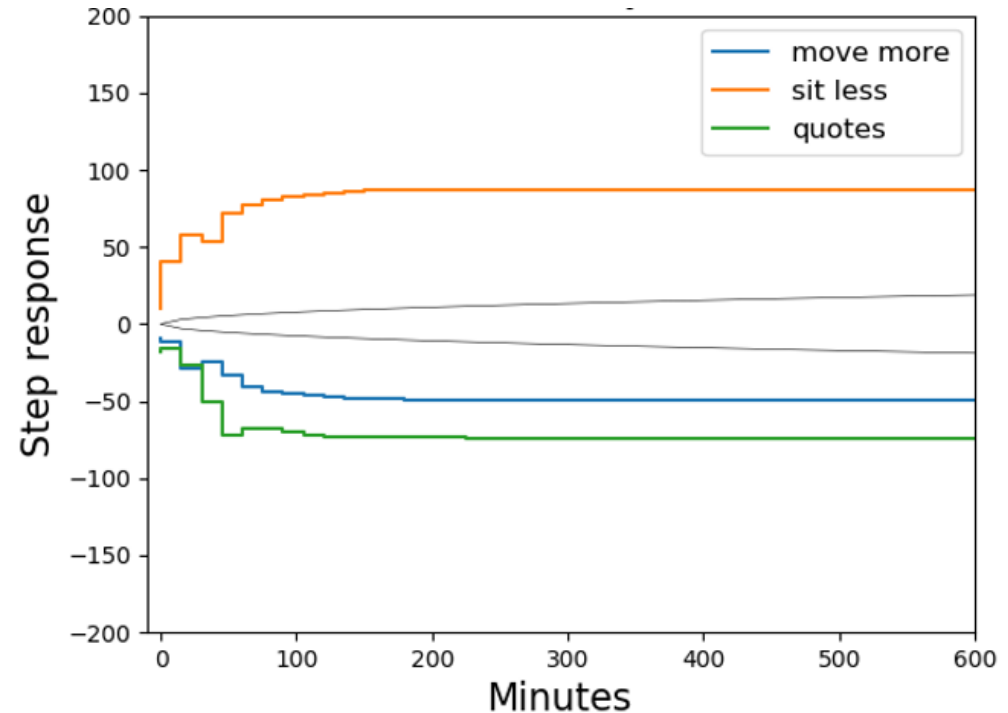


# Dynamical models allow us to forecast behavioral responses to messages

Impulse responses describe instantaneous changes in behavior

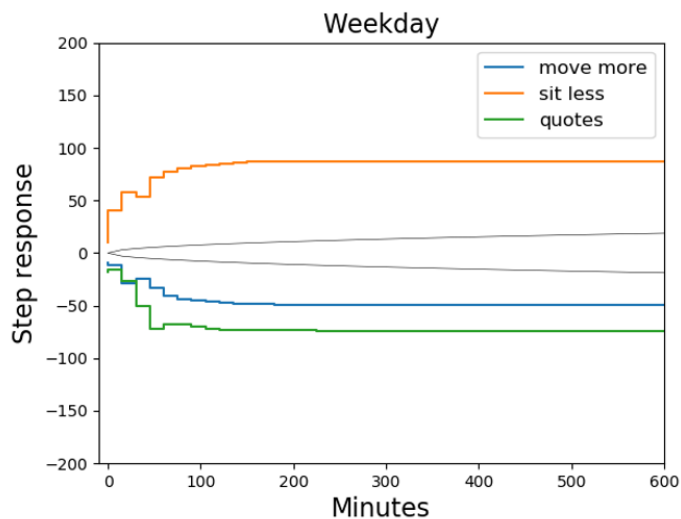


Cumulative step responses describe overall changes in behavior

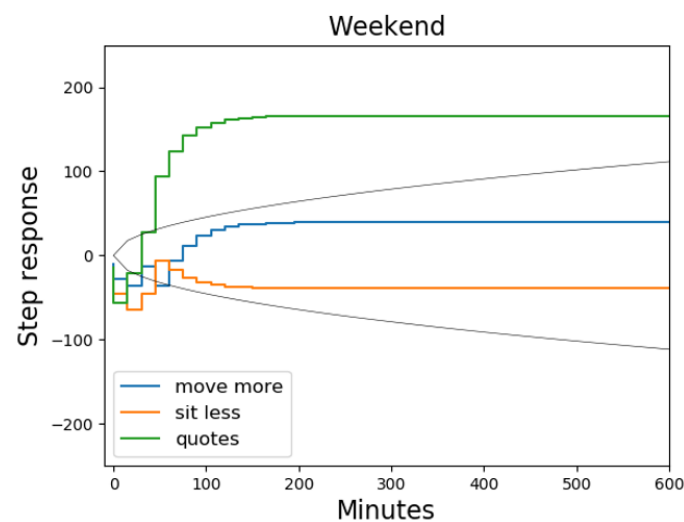
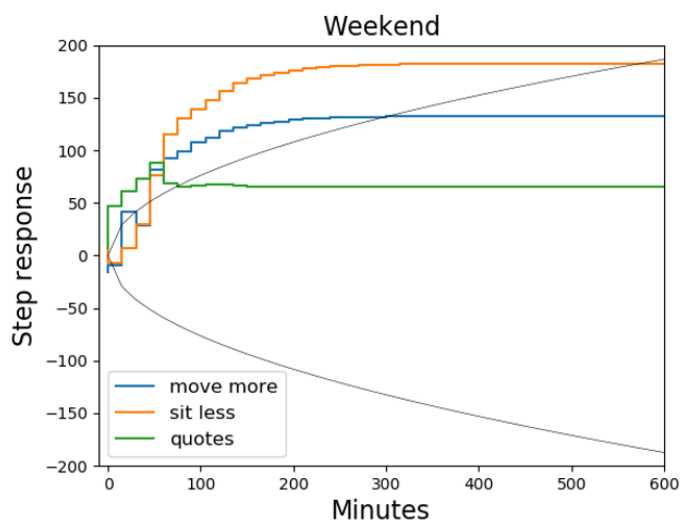
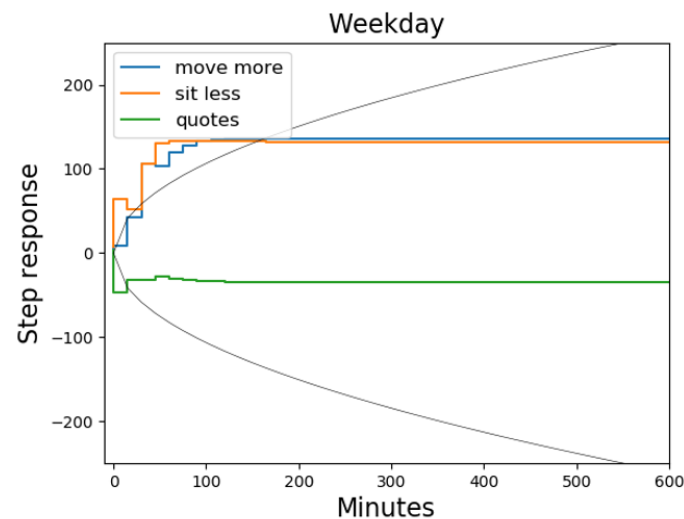


# Behavioral responses vary as a function of person, message type, and day-of-week

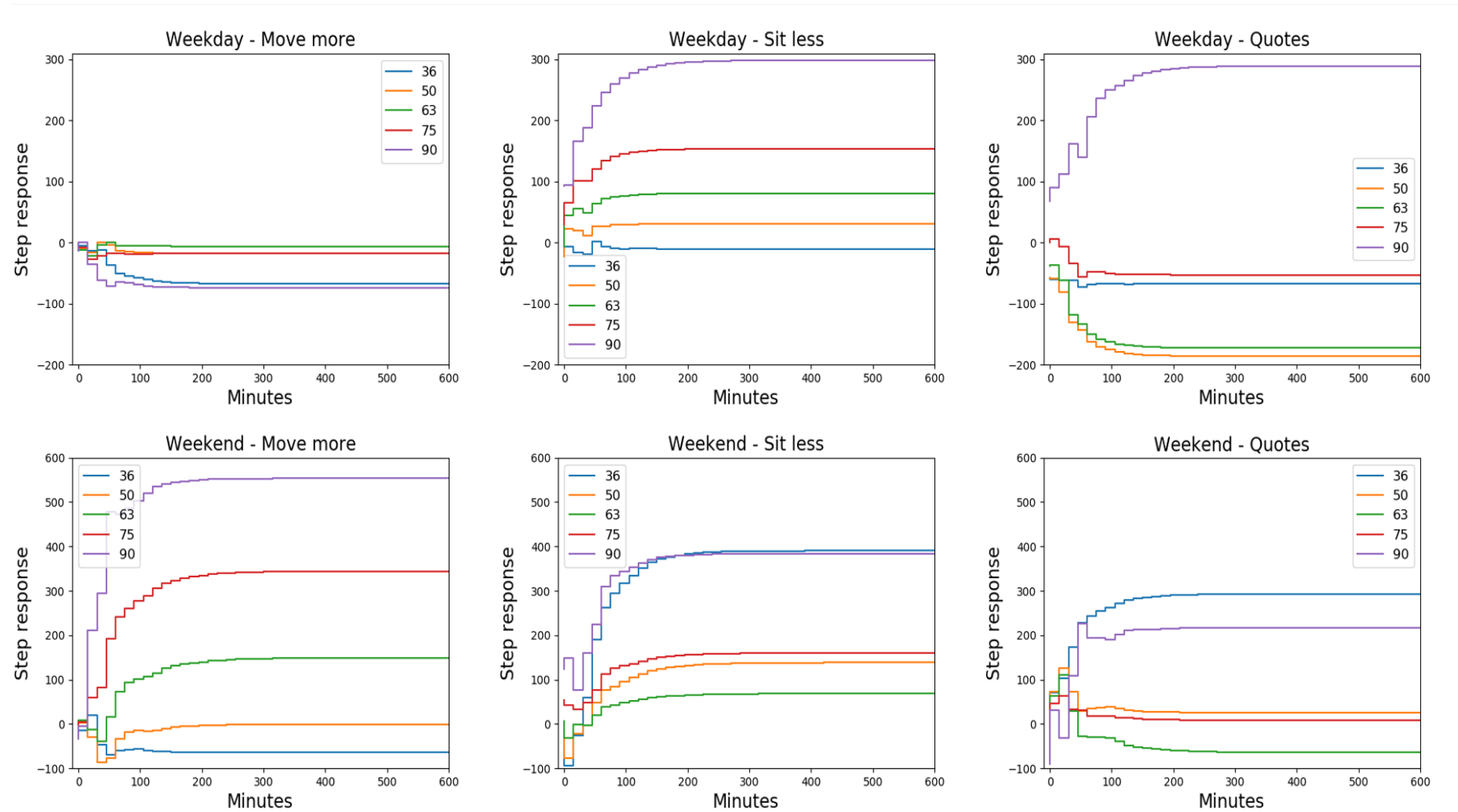
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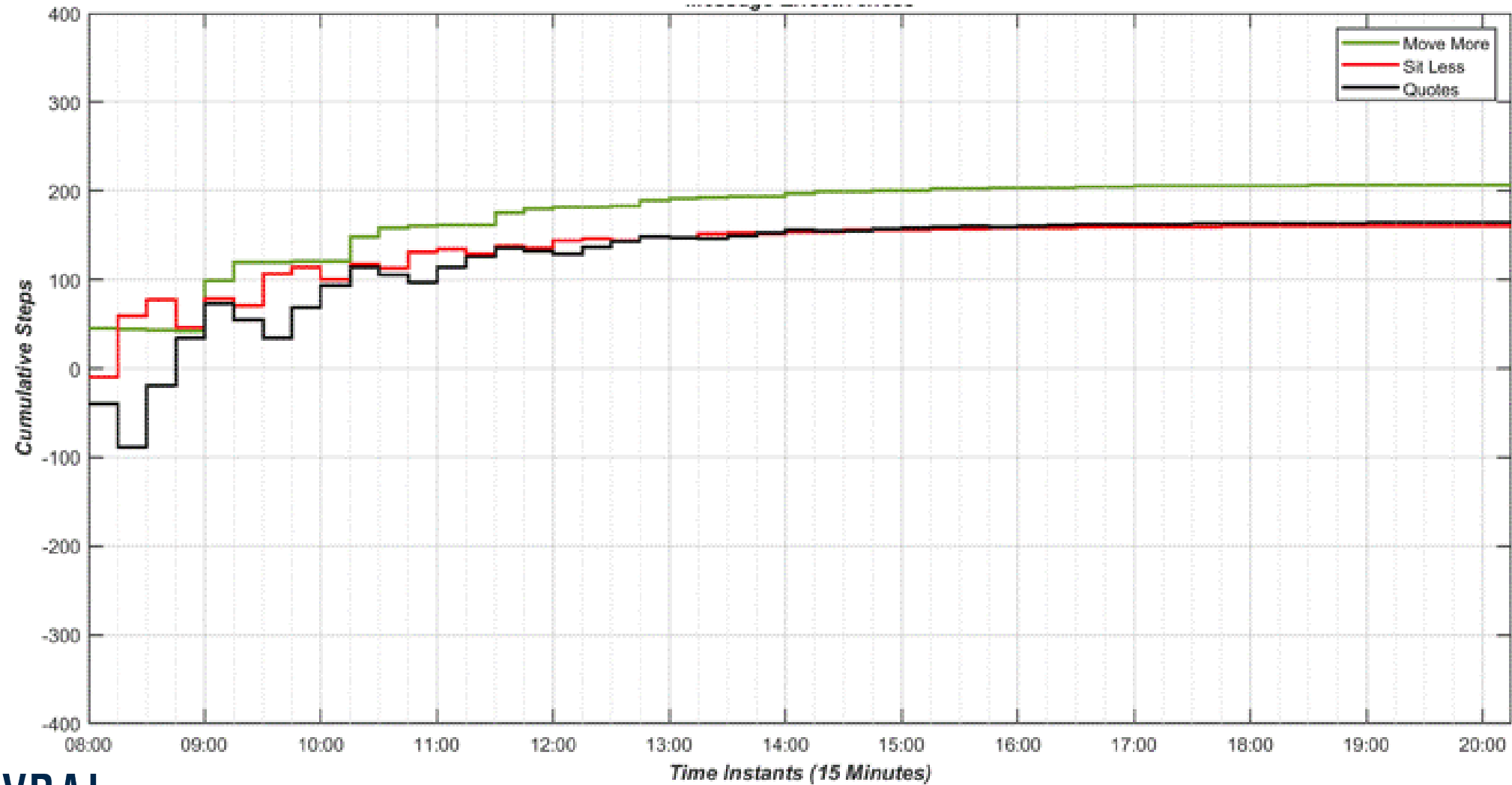
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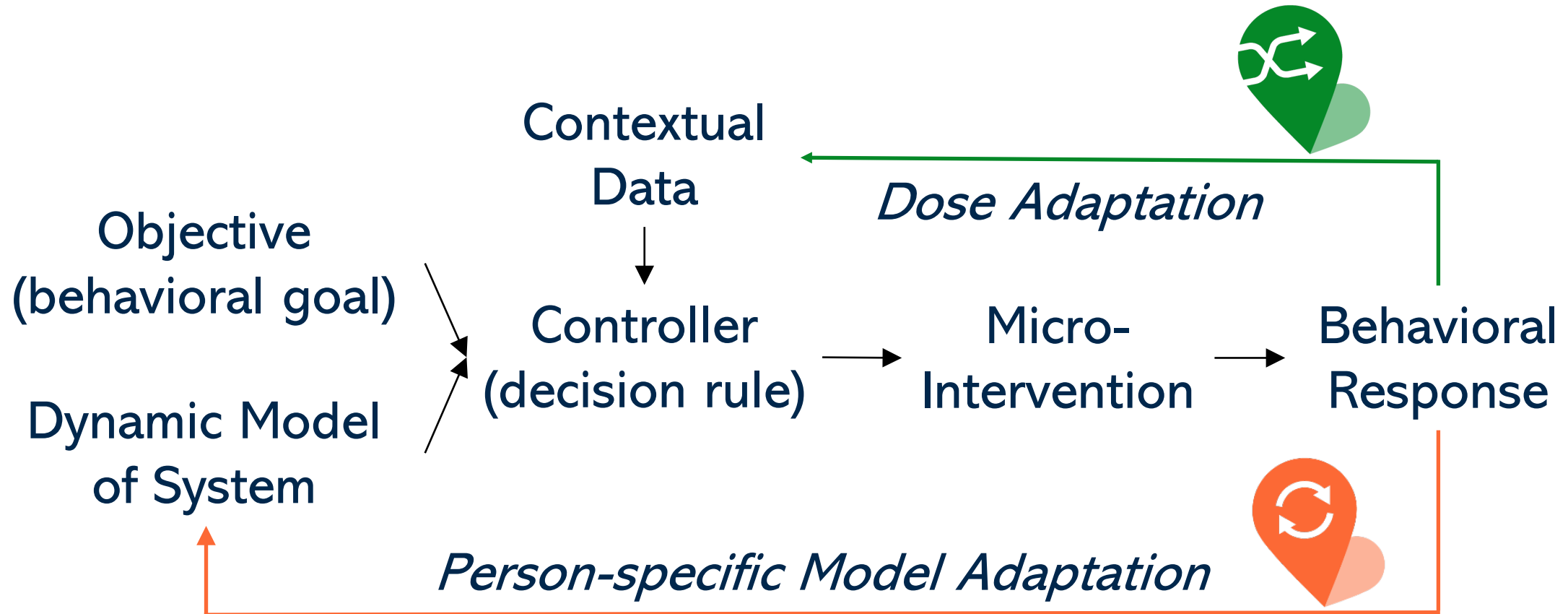
# Behavioral responses are temperature graded



# Message effects vary by time-of-day



# Precision behavioral intervention pipeline



# Major gaps & opportunities for research



What contexts predictably alter fast & slow time scale behavioral system dynamics?

When is a generic context-sensitive model sufficient for dosing behavioral interventions?

How do we prompt LLMs to engage targeted mechanisms of action for behavior change?

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