Ecological Momentary Assessment of Daily Functioning Among Older Adults Living with HIV

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Functional Disability and HIV

- Daily functioning difficulties common among older persons living with HIV
- Disability costs associated with impairments place a significant burden on society
- Functional disability expenditures have made HIV among the most serious and expensive chronic illnesses
- Research to date has focused on HIV-associated NCI

CDC, 2008; Smith, 2006; Morgan et al., 2012; Vance et al., 2011, 2013

HIV-associated NCI known to have negative consequences, however….

- Still know very little known about:
  - » (1) How those with HIV-associated NCI are getting along in their daily lives
  - » (2) Functional impairment has been observed in some older HIV+ adults without NCI
  - » (3) Who may need the most assistance
  - » (4) What areas of real-world functioning interventions should target

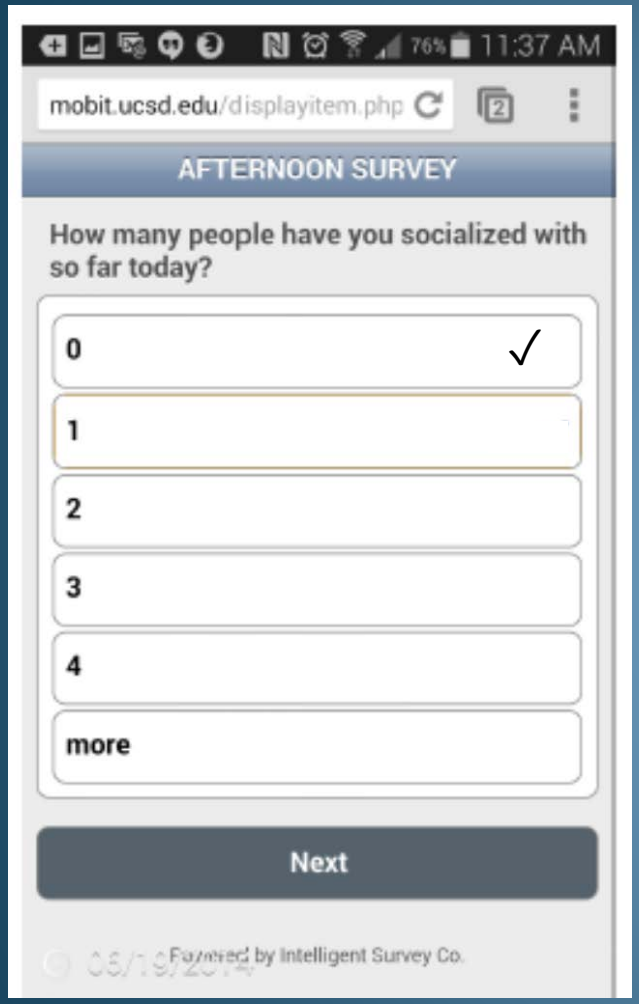
Albert et al., 1995; Hinkin et al., 2002; Thames et al., 2011; Heaton et al., 2010

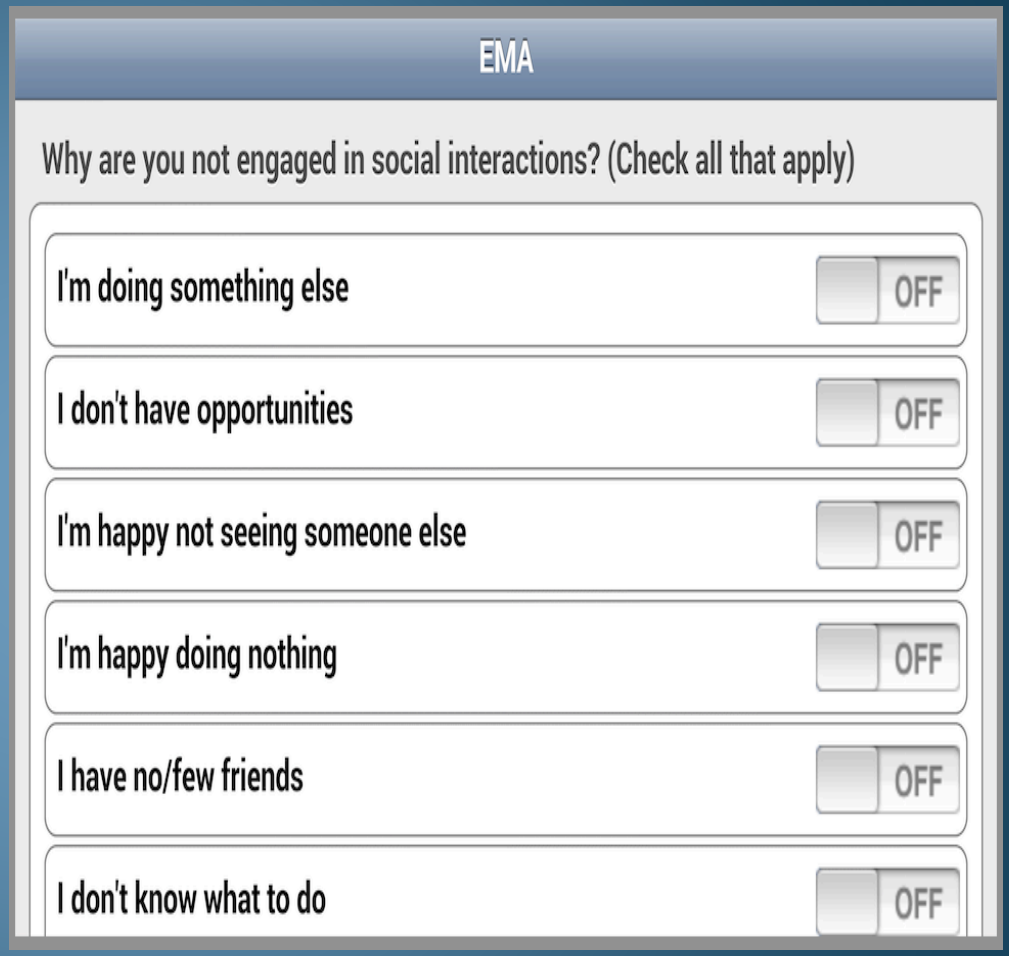
Ecological Momentary Assessment (EMA)

- EMA is an *innovative approach* to measuring real-world outcomes that takes advantage of advances in modern technology
- Ambulatory data collection technique – allows for real-time *in vivo* assessment of functioning behaviors

EMA Functioning Survey

- Level 1 questions: Time Use
  - » Where are you?
  - » Who is with you at the moment?
  - » Since last alarm, how many times did you socialize with someone else?
  - » What are you doing?
- Level 2 questions: Ratings Around Individual Behavior
  - » Socialization questions (satisfaction, degree interacting, why not interacting)
  - » Vocational questions (productive, concentrating, difficulty, etc.)
  - » IADL questions (difficulty, enjoyment, etc.)
- Level 3: Pain, Fatigue, Mood, Sleep
- Level 4: ARVs, Substance Use, Sexual & Drug Seeking Behaviors


11:37 AM
mobit.ucsd.edu/displayitem.php
AFTERNOON SURVEY
How many people have you socialized with so far today?
0
1
2
3
4
more
Next
Powered by Intelligent Survey Co.


EMA
Why are you not engaged in social interactions? (Check all that apply)
I'm doing something else
OFF
I don't have opportunities
OFF
I'm happy not seeing someone else
OFF
I'm happy doing nothing
OFF
I have no/few friends
OFF
I don't know what to do
OFF

Purpose

- To test the feasibility, acceptability, and initial validity of EMA among older HIV+ adults

- To examine the relationship between EMA-measured daily functioning and neuropsychological performance

Participant Demographic & Clinical Characteristics (N=20)

Age	M = 59 (4); range = 51-67
% Female	15% (n=3)
Ethnicity (% Caucasian)	70% (n=14)
Education	13 (3); range = 8-20
Receiving Disability (%)	64% (n=7; missing data for 9 pts)
RBANS Total Score	98.9 (13); range = 78-122
BDI-II	7.4 (9.5); range = 0-38
Est. duration of HIV (yrs)	M = 20.4 (7.8); range = 4.8-29.8
AIDS (%)	70%
ON ART (%)	90%
Nadir CD4 (cell/µl)	128.55 (106.52); range = 7-350
Current CD4 (cell/µl)	476.21 (167.15); range = 108-750
Detectable Plasma VL (%)	5% (n=1)

Methods

Baseline

- Measures: RBANS
- Training in smartphone, EMA questionnaire usage

At-Home

- EMA 5x/day for 1 week

Follow-Up

- Measures: PANAS, POMS, follow-up survey

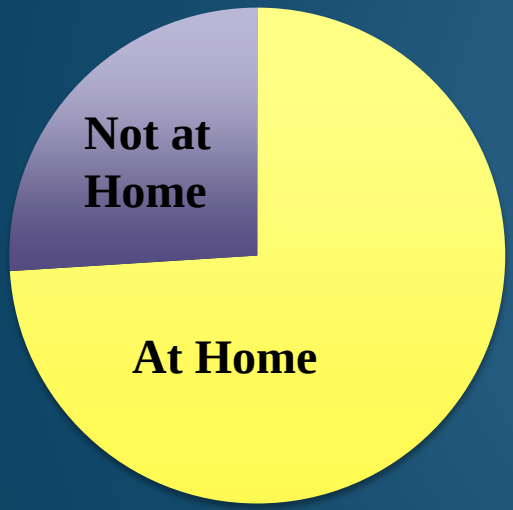
EMA Feasibility & Acceptability

- EMA ADHERENCE:
  - » 86% of surveys completed; 605 data points

Acceptability Items	Average Response (Not at all → Very Much; Strongly Disagree → Strongly Agree)
Difficulty Operating Phone	Not at all
Difficulty Understanding Questions	Not at all
Phone Interferes with Activities	Not at all/A little bit
Enjoyed Experience	Quite a bit
Phone Could be Helpful in the Future	Strongly agree
Would Use Smartphone Again	Agree
Paid Attention to Things Normally Wouldn't Have	Agree

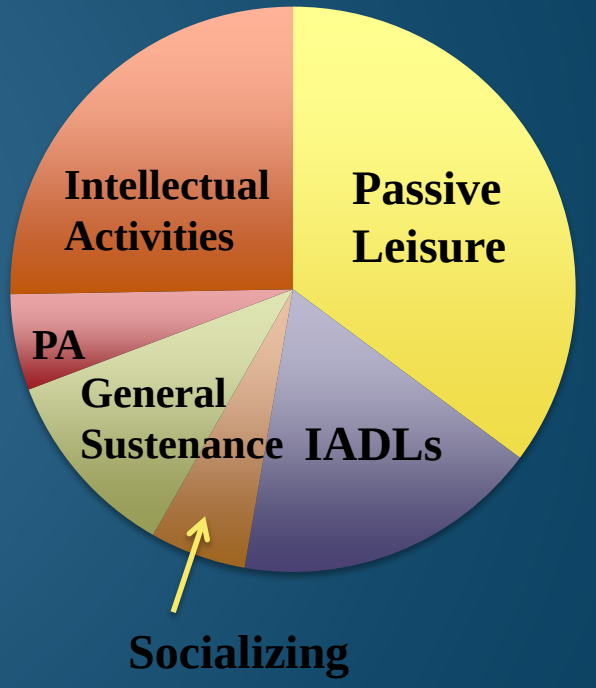
How are older HIV+ adults spending their time?

Where are you?



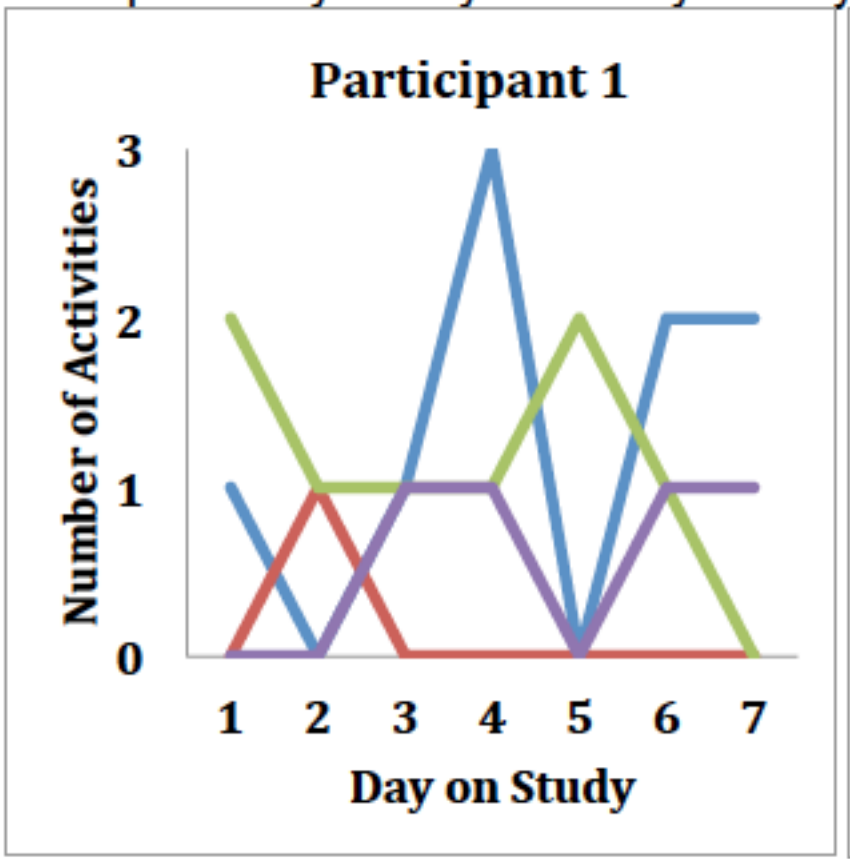
Who are you with?

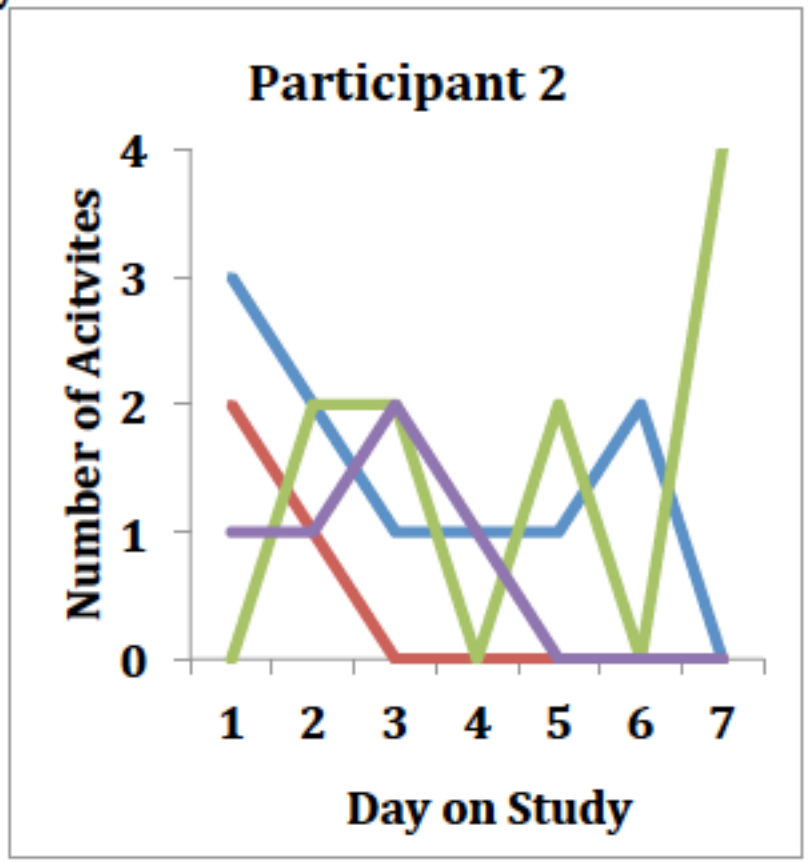
What are you doing?



Individualized, day-to-day variability in engagement in daily life activities

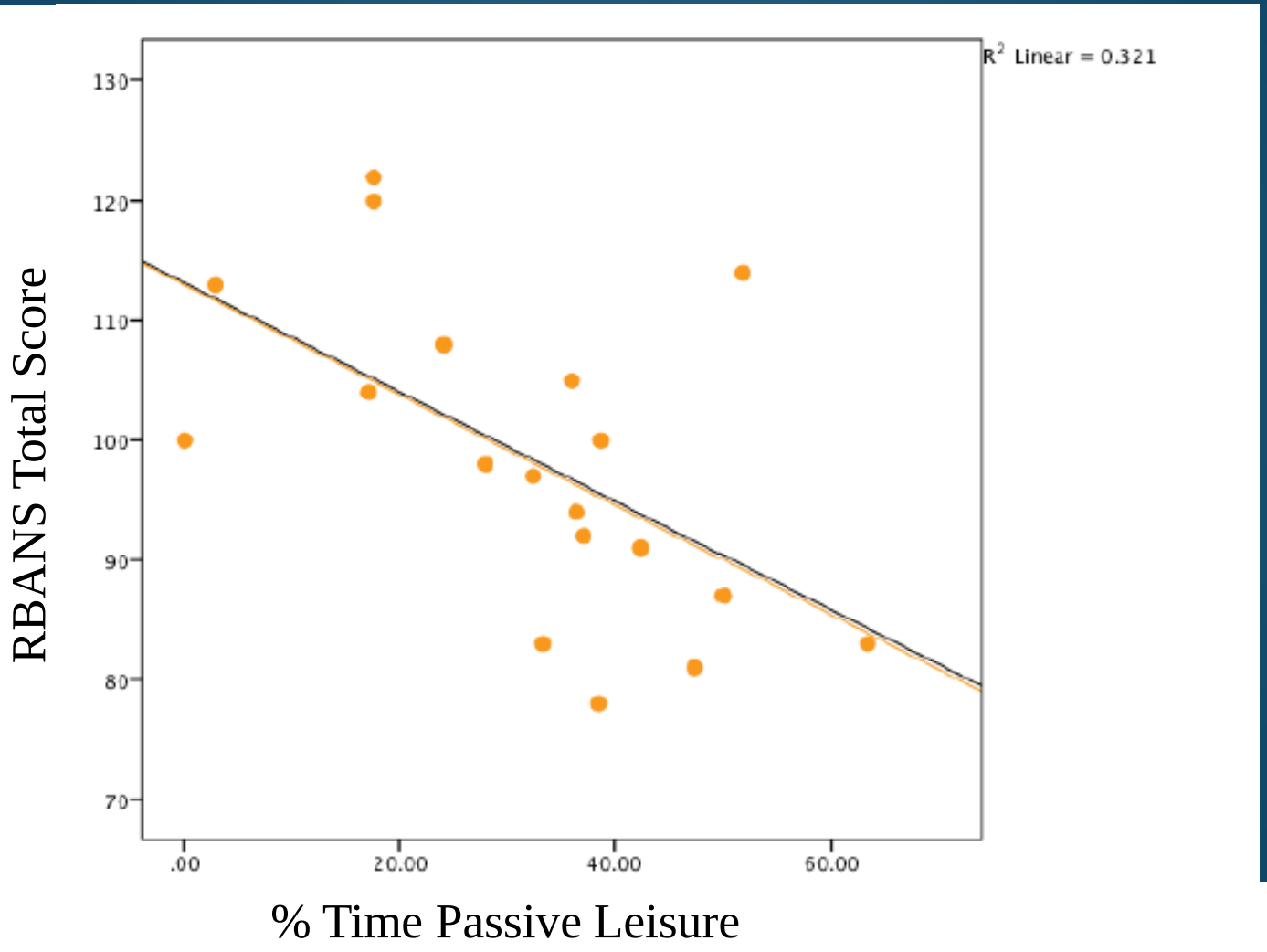
Example of day-to-day variability in daily life activities in 2 older HIV+ adults





Key: Intellectual Activities IADLs Socially-Engaging Activities Passive Leisure Activities

Worse Neurocognitive Ability related to Passivity



Correlations with Cognition & Affect

EMA Variables	RBANS Total Score	PANAS Positive Mood	PANAS Negative Mood	POMS Confusion/Bewilderment
Sad	–	↓	↑	↑
Stressed	–	–	↑	↑
Happy	–	↑	↓	↓
Forgetful	–	↓	↑	↑
Trouble Concentrating	–	↑	↑	↑

Conclusions and Future Directions

- EMA feasible and acceptable
- Non-NCI older HIV+ adults spend a remarkable amount of time at home, alone, and engaged in restricted range of adaptive behaviors
- Initial validity with mood & cognitive complaint measures
- Beginning a larger study to understand factors that differentiate older HIV+ from HIV- adults in terms of daily functioning and address reasons for functional disability → establish most pertinent future treatment targets

Limitations

- Need larger sample, including patients with NCI, to discover discrepancies in self-report vs. EMA
- Need larger sample to examine within-person variability in mood and other time-varying factors and how they impact future engagement in daily life activities
- No truly objective measures (e.g., sensor data)

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Risk & protective factors that influence real-world functioning in older HIV+

STATIC FACTORS	TIME-VARYING FACTORS
Sociodemographic	Mood (depressed, happy, anxious, stressed)
Cognitive Reserve, NP Ability, Functional Skills	Cognitive Activity
Non-HIV Medical	Psychosocial Factors (social support, interactions)
HIV-Related Disease Characteristics	Positive & Negative Lifestyle Factors (exercise, substance use, risky behaviors)
Positive Psychological Traits	Sleep
	Pain

- Age and HIV associated with NCI → older HIV+ adults disproportionate disruption in real-world daily functioning
- HIV-associated NCI does not always relate to functional impairment as measured with standard daily functioning assessment methods
- Functional impairment has been observed in absence of NCI
- Numerous static and time-varying risk and protective factors that may moderate the effects of NCI on individual older HIV+ adults' daily tasks and activities

- Available assessment methods do not capture the combination of risk and protective factors impacting daily functioning, nor do they assess day-to-day variability in daily functioning, at the intersection of HIV and aging.

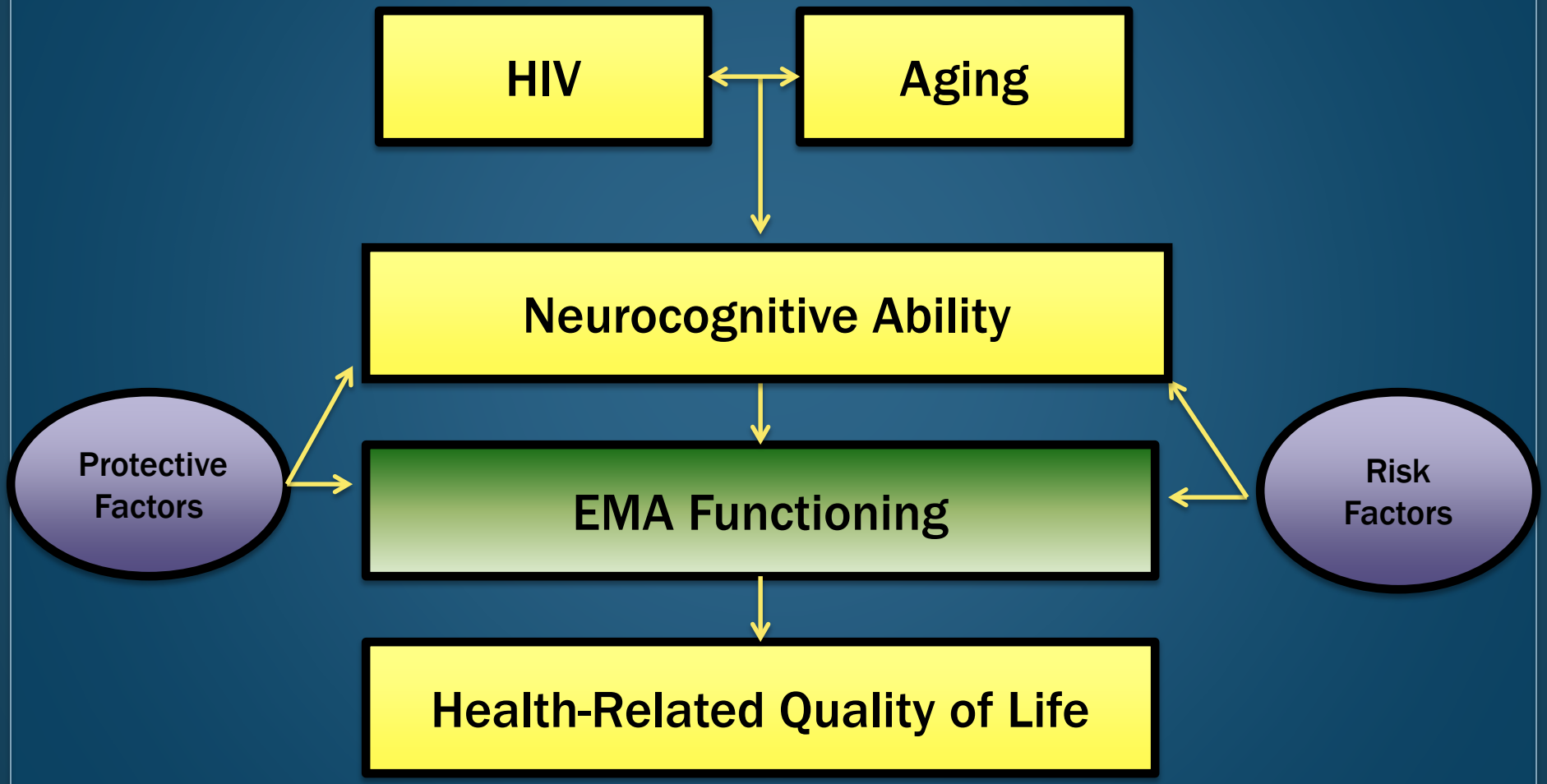
- -HOWEVER, many neurocognitively normal older HIV+ adults report declines in daily functioning AND many who are neurocognitive impaired do not. This mismatch is likely due to
- (1) the inability of standard measures to identify how older adults with HIV are spending their time and who is in the greatest need of interventions to enhance functioning and
- (2) Other factors in addition to NCI that may serve as barriers and facilitators to daily functioning among older HIV+ adults

HNRC Pilot – Prelim Assessment Results

	Pain	Tired	Happy	Stressed	Sad	Forgetful	Problems Concentrating
At home	1.9	2.9	4.5	2.4	2.1	1.6	1.7
Not at home	2.8	2.7	5.1	2.1	1.6	1.3	1.6

Alone	1.8	2.8	4.2	2.6	2.4	1.7	1.7
Not Alone	2.6	2.9	5.2	1.8	1.5	1.3	1.7

Need to identify potentially modifiable behavioral treatment targets related to real-world functioning in HIV



EMA Functioning Questionnaire

DOMAINS
Basic & Instrumental Activities
Leisure Activities
Social Interactions
Vocational and other Cognitively Demanding Activities
Physical Activities
Mood, Sleep, Pain
Cognitive Appraisals
cART & Substance Use

INDICATORS
Time Use
% Time Engaged in Activities
Rating on performance
Rating of independence

Ecological momentary assessment (EMA) via smartphones permits the measurement of daily functioning in real-world settings which could be useful for studies of older HIV+ individuals

Ecological Momentary Assessment (EMA)

- EMA provides an index of what people are *actually doing in real-world settings* using repeated within-day and between-day assessments

- Assesses people while engaged in *daily activity, social activity, self-maintenance*, and *employment activities*, including *where and with whom* these activities are performed