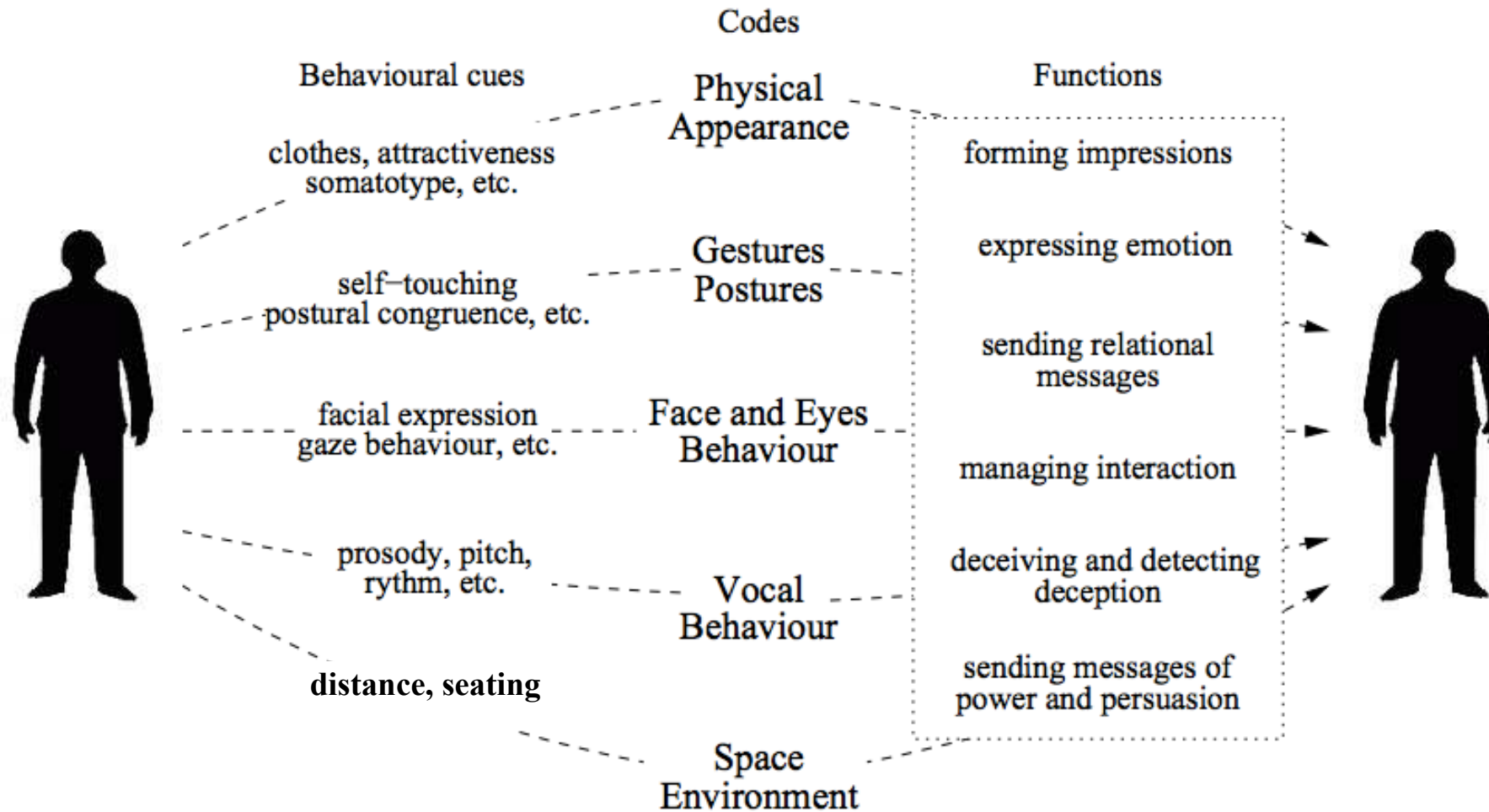


CCC 2016

Cyber Social Learning Systems

Mary Czerwinski

Honest Signals (as important for learning systems as for humans)—trust, behavior change, etc.



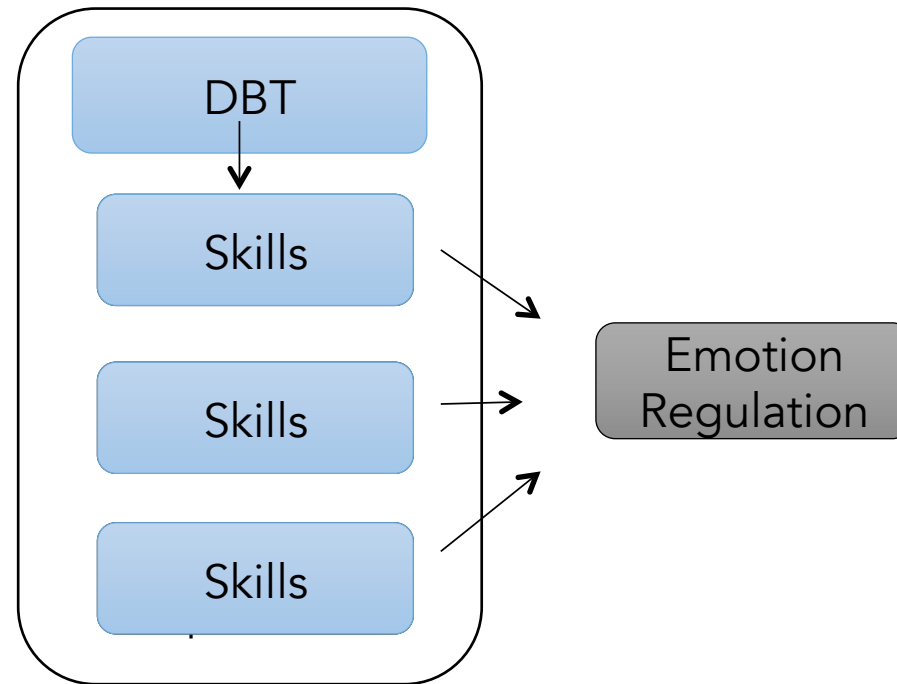
Affective Computing

- **Precision Psychology: using ML to target skills training**
 - Using ML for understanding what parts of DBT work for which people/problems/contexts
- **Conflict management**
- **Group decision making**
 - Better policy->equal distribution of resources, underserved?
- **Productivity and stress**
- **Creativity and Flow**



DBT: Dialectical Behavior Therapy

DBT is a modular and transdiagnostic treatment specifically designed for suicidal individuals presenting with multiple problem behaviors related to emotion dysregulation



Linehan, 1993; Linehan 2014; Stoffers et al., 2012; Panson et al., 2013; Harned et al., 2008

DBT: The Scalability Problem

It works really well!

- Gold standard for BPD and suicide (Kliem et al., 2010; Stoffers et al., 2012; Ward-Ceileiski & Linehan, 2015).
- DBT is highly effective for dual diagnosis (See Dimeff & Linehan, 2008).
- DBT also reduces:
 - Depression (Harned et al., 2008).
 - Anger (Neiscui et al., 2015)
 - PTSD (Harned, Korslund, & Linehan, 2015).
 - Functional Impairment (Wilks, Korslund, Harned, & Linehan, 2015).

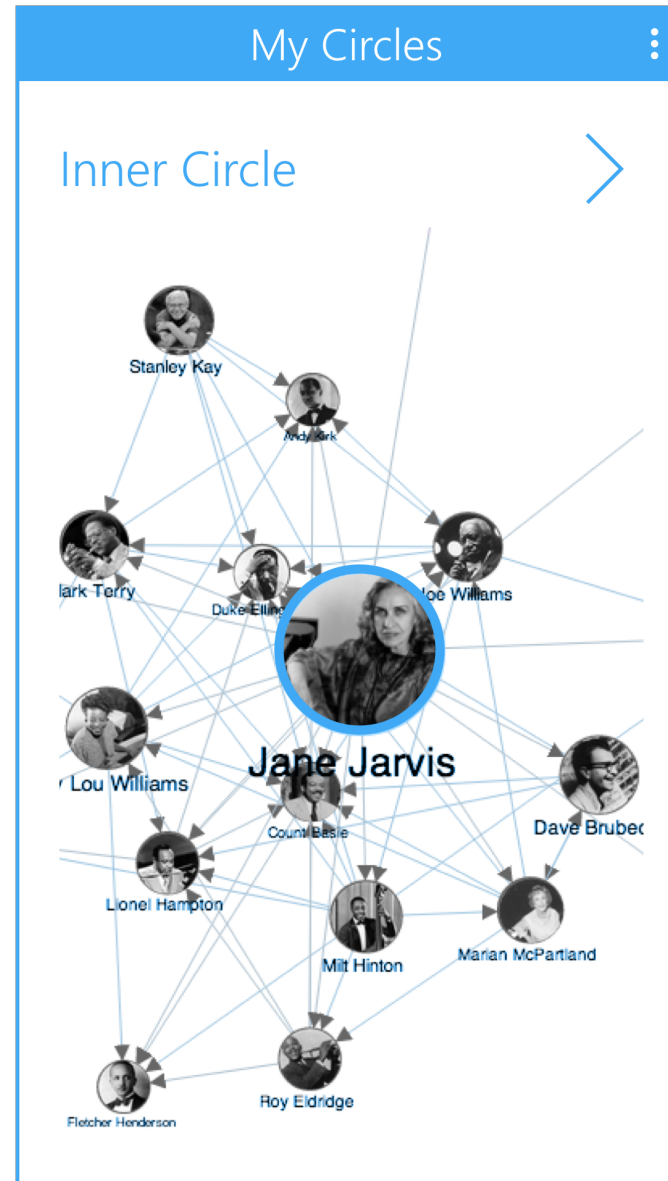
However

- In 2010, 5.2 million American adults in need did not receive any psychological treatment (Institute of Medicine, 2012).
- 63% of suicide decedents not in contact with mental health care in the *year* prior to their death (Luoma et al., 2002).
- Waiting times for evidence-based treatments like DBT range from 8 weeks to 18 months—worse for low income (e.g. Van den Berg et al., 2006; Trusler, 2008).
- The few online attempts have failed

Example Research Method: Path to improve treatment access

- Translate the active components of face-to-face treatment into a mobile application
- Iterative research design—1st prototype w/ Human in the Loop:
 - Recruit clinical population ($N=10$)
 - Continual assessment about what works and what doesn't work and make changes accordingly; active human intervention; a work in progress
- 2nd iteration: machine learning:
 - (1) Determine what works & what's liked and for whom and where
 - (2) Improve face-to-face treatment by understanding ecological skill use
- After learnings, map out to larger number of people

E1 My Inner Circle



HeathSense: Creating a flow experience for work

Gloria Mark, Shamsi Iqbal, Mary Czerwinski, Paul Johns

Biometrics are cheap and widespread



HealthSense:

Improving and empowering the workplace experience

Goal: to capture as comprehensively as possible the workplace experience: through sensors, biosensors, probes, computer logging



Focus, productivity and stress

Mark, Iqbal,
Czerwinski, Johns,
CHI'14

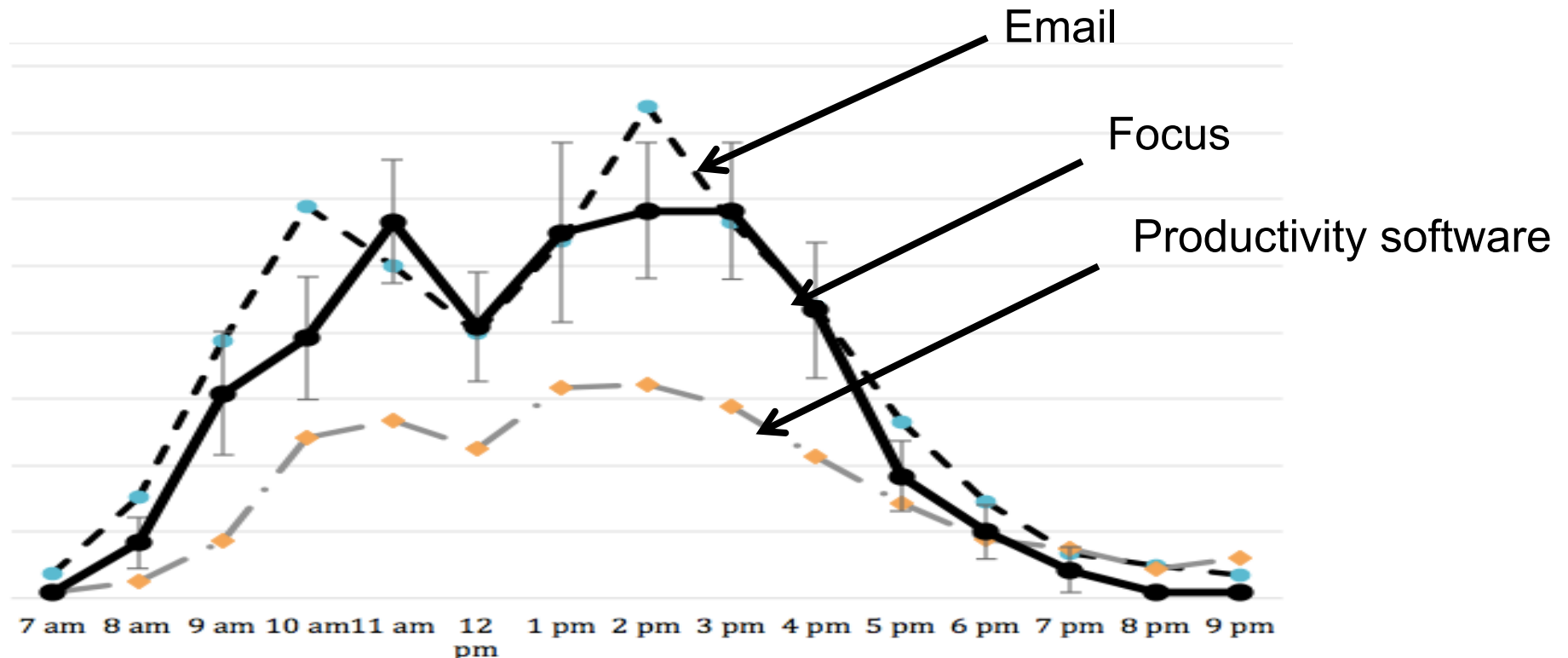
Attention focus follows rhythmic patterns in the workday

Computer usage characterized by short segments of focus

Email duration detrimental to productivity, stress and mood

Feeling in control is essential to productivity

Daily temporal
patterns



What predicts computer attention duration?

Factor: 'Lack of control' explains 19% of variance

Lack of control comprised of:

- High Neuroticism

- Impulsivity: lack of perseverance

- Stress

Workplace mood

Factors:

Shorter Sleep**

Concentration difficulty*

Email duration**

Workplace productivity***

Non-sedentary activity

Controlled for:

Job Demands

Job Decision Latitude*

Age**

Gender

adj. $R^2 = .48$

Can biometrics tell us how difficult it is to comprehend source code? (ICSE 2014)

- Devs compare pairs of almost identical programs with small changes designed to induce comprehension difficulty.
- We used eye tracking, electrodermal activity (EDA), and EEG to predict developer self-reports of comprehension difficulty.
- Machine learning classifiers get 85% precision, 70% recall when trained on each task.



←

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8/21/2016 - 8/27/2016

Your time

Your stats are based on your email and calendar

Learn more

Meeting hours

47

hours

Goal < 10 hours

Edit goal

Email hours

16.1

hours

Goal < 10 hours

Edit goal

Focus hours

11.5

hours

Goal > 10 hours

Edit goal

After hours

26.1

hours

Goal < 10 hours

Edit goal

Network

Stay in touch

Notes

11:33 AM 8/30/2016

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New CSLS Topics

- Not a deterministic system—theoretical at a hybrid level
 - Expect the unexpected and continuously learn (both human and system)/unlearn
 - Have to have provenance
 - Continuous experimentation
 - Influence of the crowd/interventions
 - Difference between complicated and complex (e.g., blueprint or not)
- New methods for studying—watch brain signals, etc.
 - Remember to study human psychology (e.g., motivation)
 - Simulation is very important
- New notions of “users”
 - Professionals (all levels), consumers
 - Different levels of skin in the game; motivation is huge; incentives

CCC CSLS 2016

- Thanks for listening!

