

Estimating People Perception of Intimacy in Daily Life from Context Data Collected with Their Mobile Phone

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Quality of Life Group



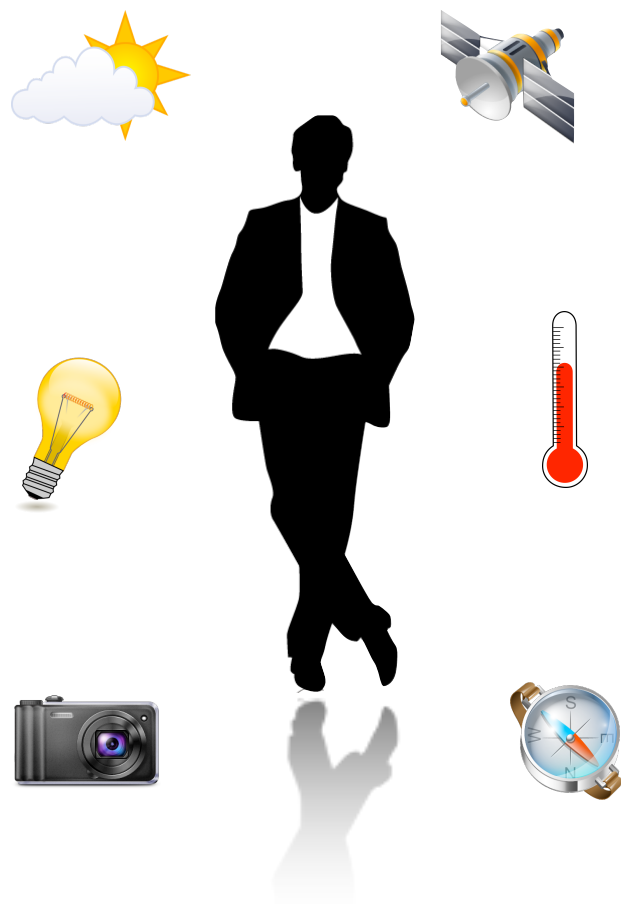
Introduction

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Introduction



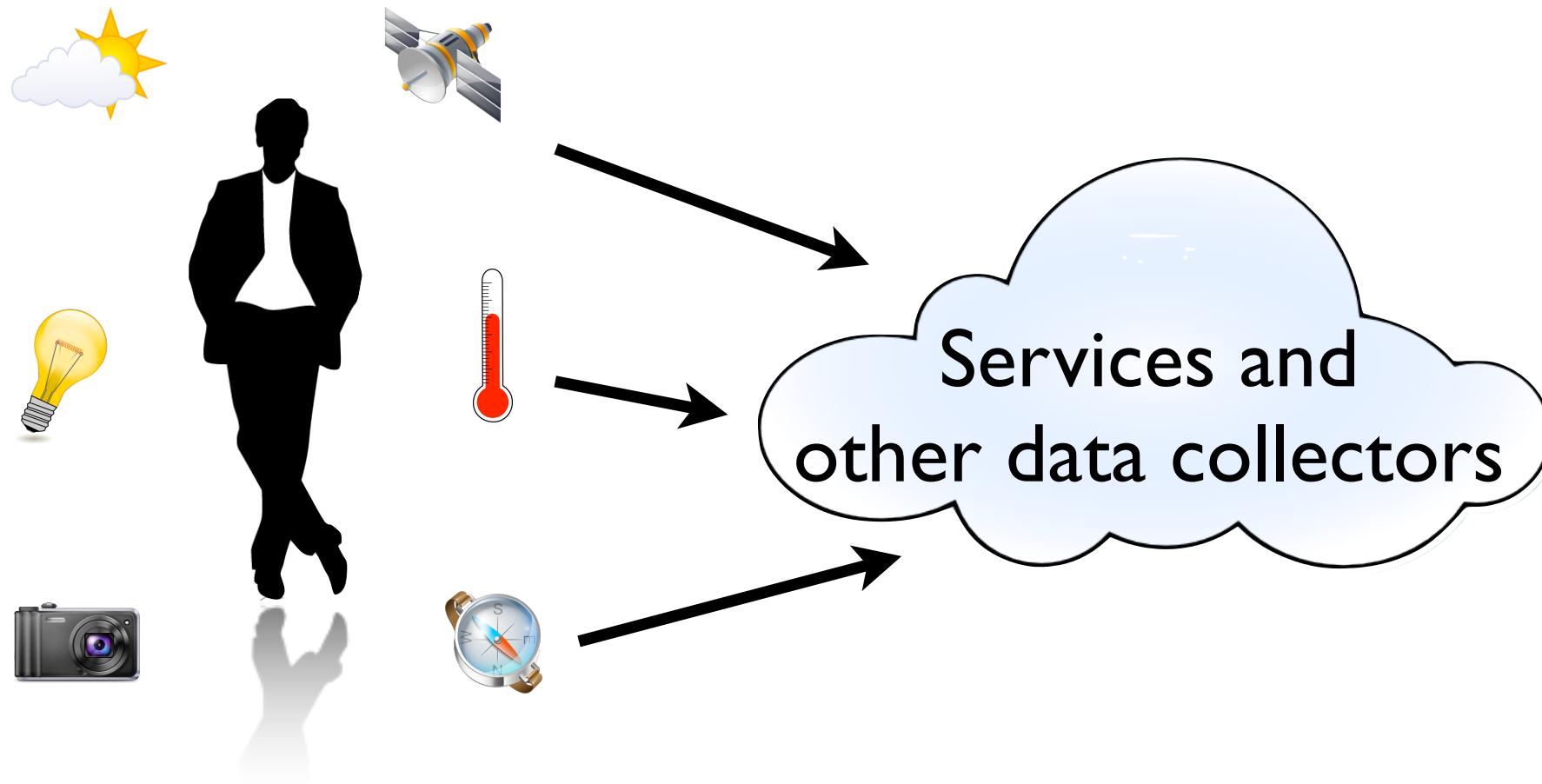
Personal Context

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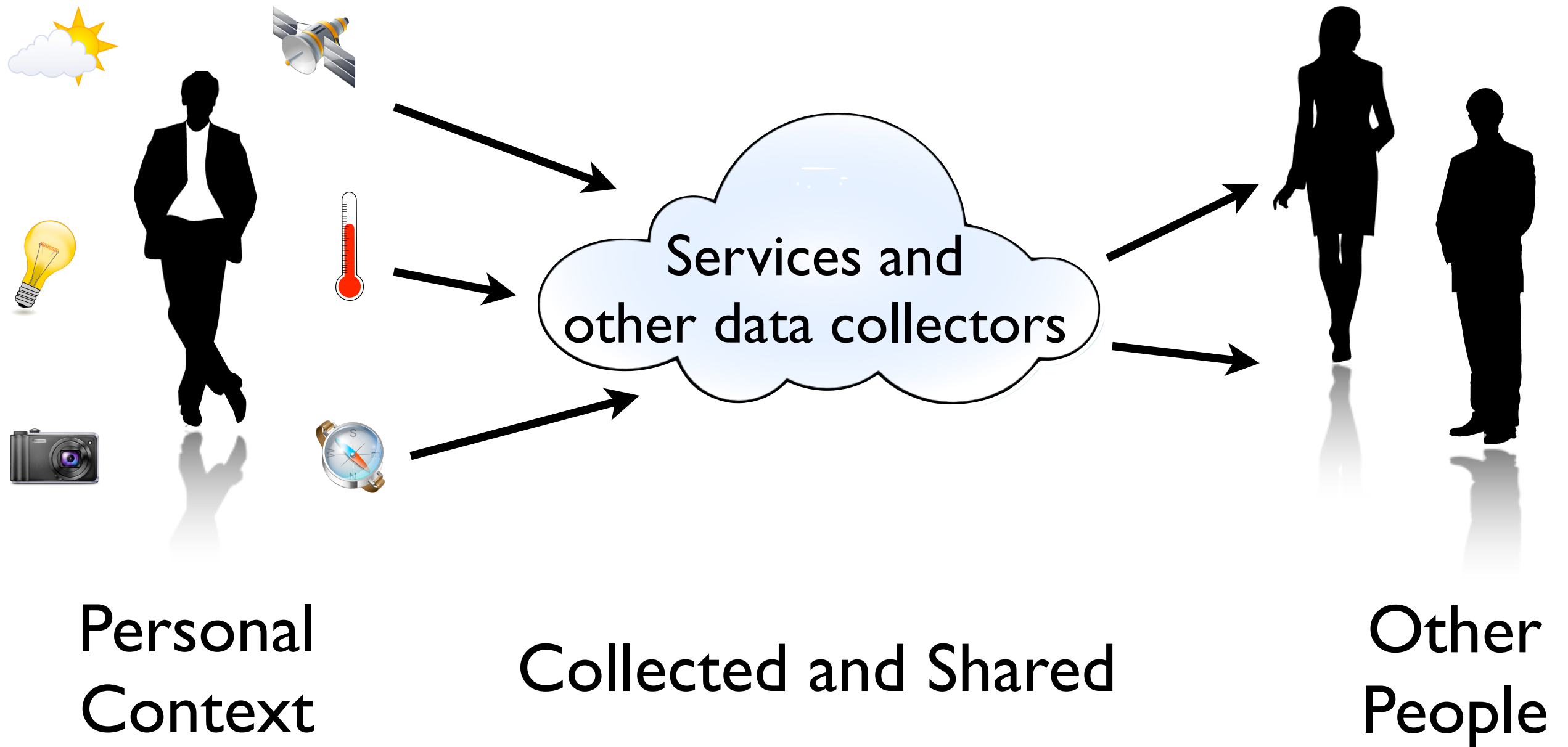
Introduction



Personal
Context

Collected and Shared

Introduction



Introduction

- Privacy control
 - what information is shared
 - with whom
- Done by “hand”
 - static preference settings
 - keep them updated

Goal

privacy → sharing

Goal



Goal



Help the automation of
privacy settings to
improve sharing control

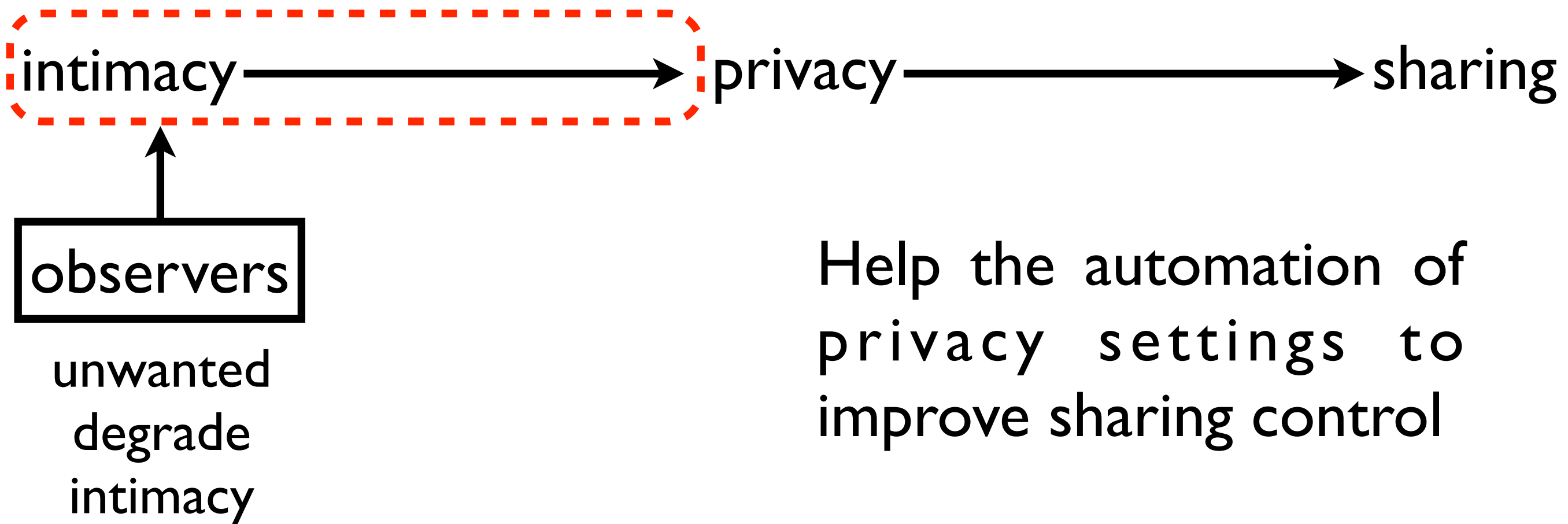
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Help the automation of
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1. R. S. Gerstein, "Intimacy and privacy," *Ethics*, vol. 89, no. 1, pp. 76–81, 1978.
2. J. H. Reiman, "Privacy, intimacy, and personhood," *Philosophy & Public Affairs*, vol. 6, no. 1, pp. 26–44, 1976
3. H.T. Reis et al., "Intimacy as an interpersonal process," in *Handbook of personal relationships*, vol. 24, no. 3, S. Duck, Ed. Wiley, 1988, pp. 367-389.

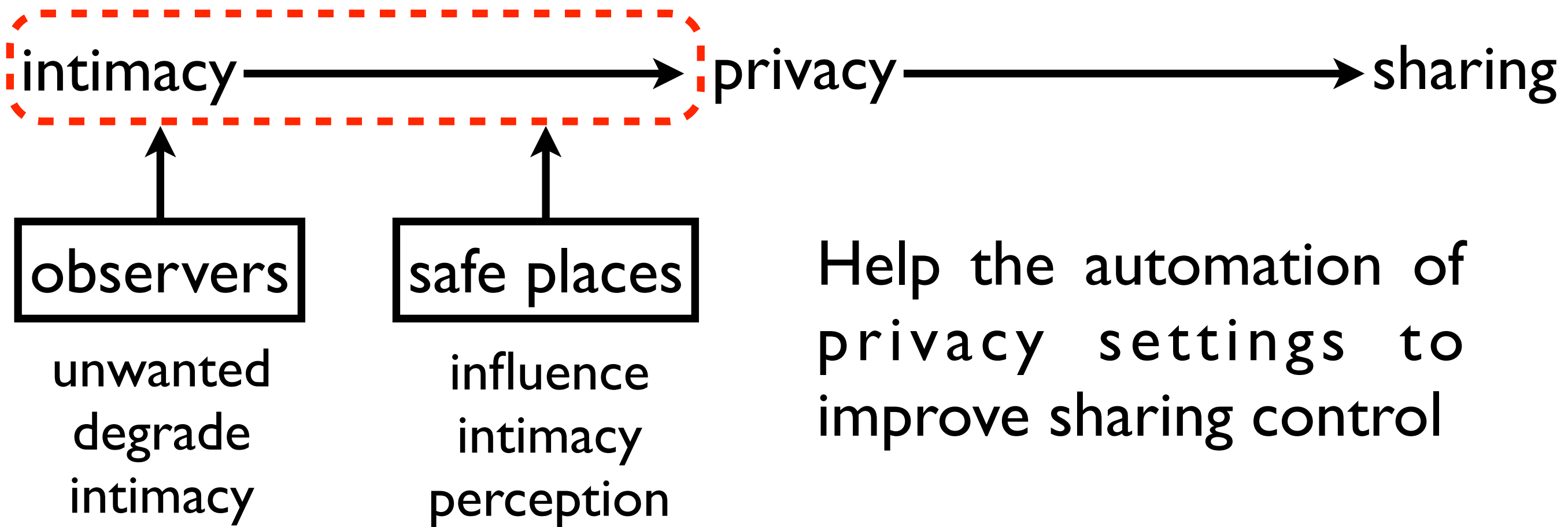
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Goal

- Use Mobile Data Challenge data to **estimate** participants **intimacy level**
- In **future** it may be possible to use intimacy *to help automate privacy management*

MDC Data Analysis

Observers	Safe Places
Bluetooth	Charging status
Ring status	Ring status
Outgoing call/SMS	Indoor/Outdoor

Observers

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Bluetooth

Observers



Bluetooth

Observers



Bluetooth

Observers



- stranger
- co-worker
- friend

Ring status

Observers

Silent 🚫



Normal 🔊



- stranger
- co-worker
- friend

Ring status

Observers

Silent 🚫



Normal 🔊



- stranger
- co-worker
- friend

Ring status

Observers

Silent 🚫



Normal 🔊



- stranger
- co-worker
- friend

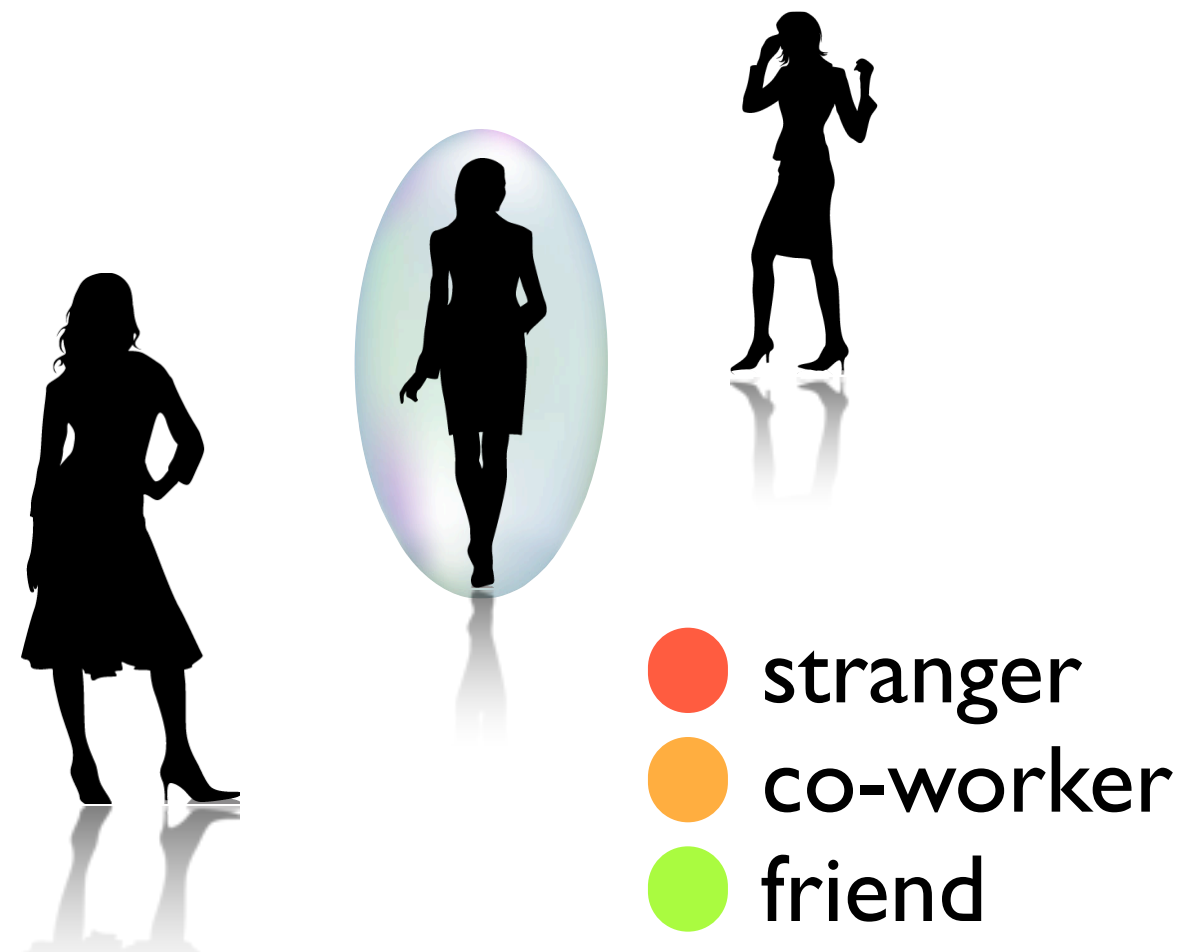
Ring status

Observers

Silent 🚫



Normal 🔊



Ring status

Observers

Silent 🚫



Normal 🔊



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Outgoing Call/SMS

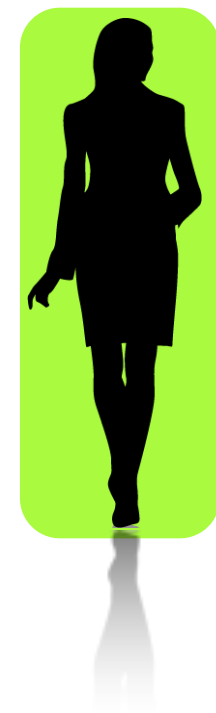
Observers



-  stranger
-  co-worker
-  friend

Outgoing Call/SMS

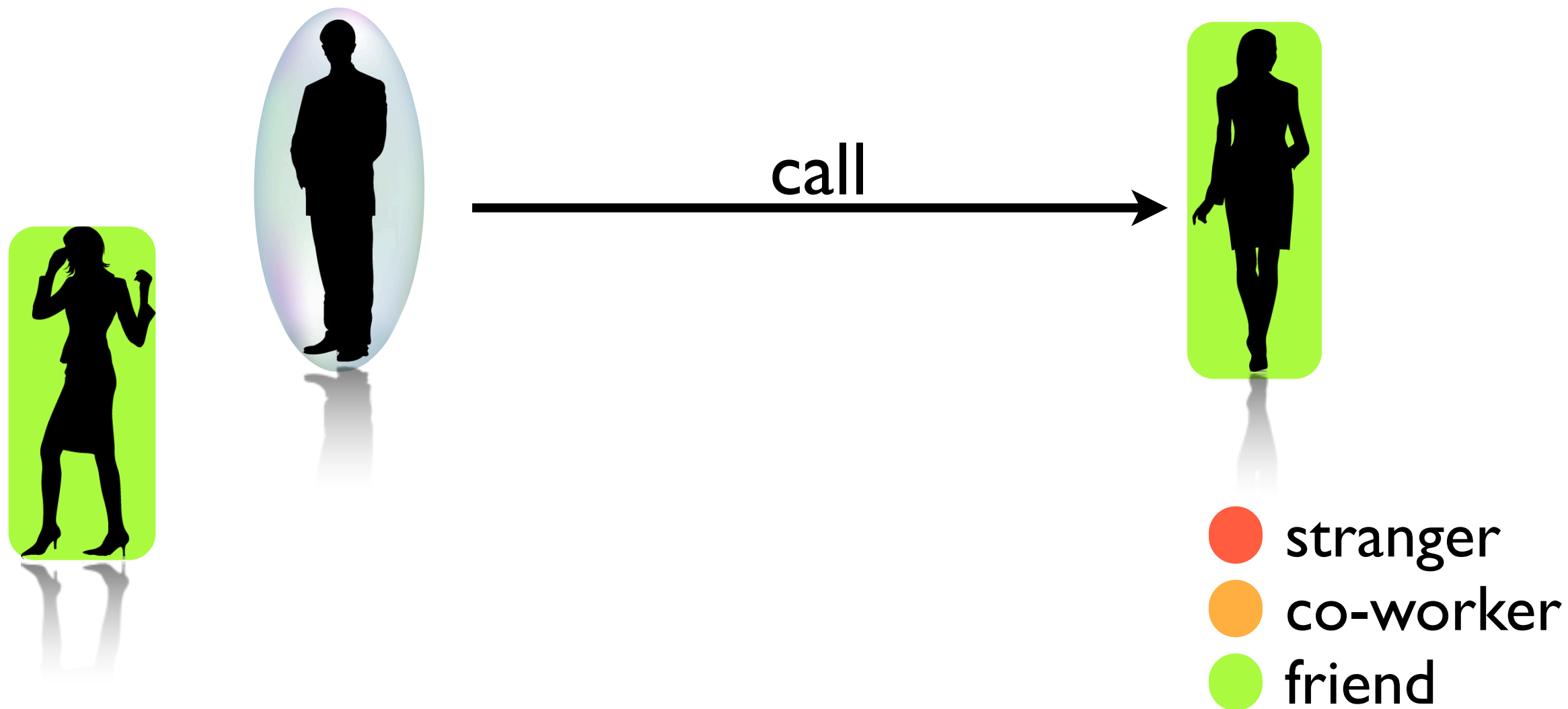
Observers



- stranger
- co-worker
- friend

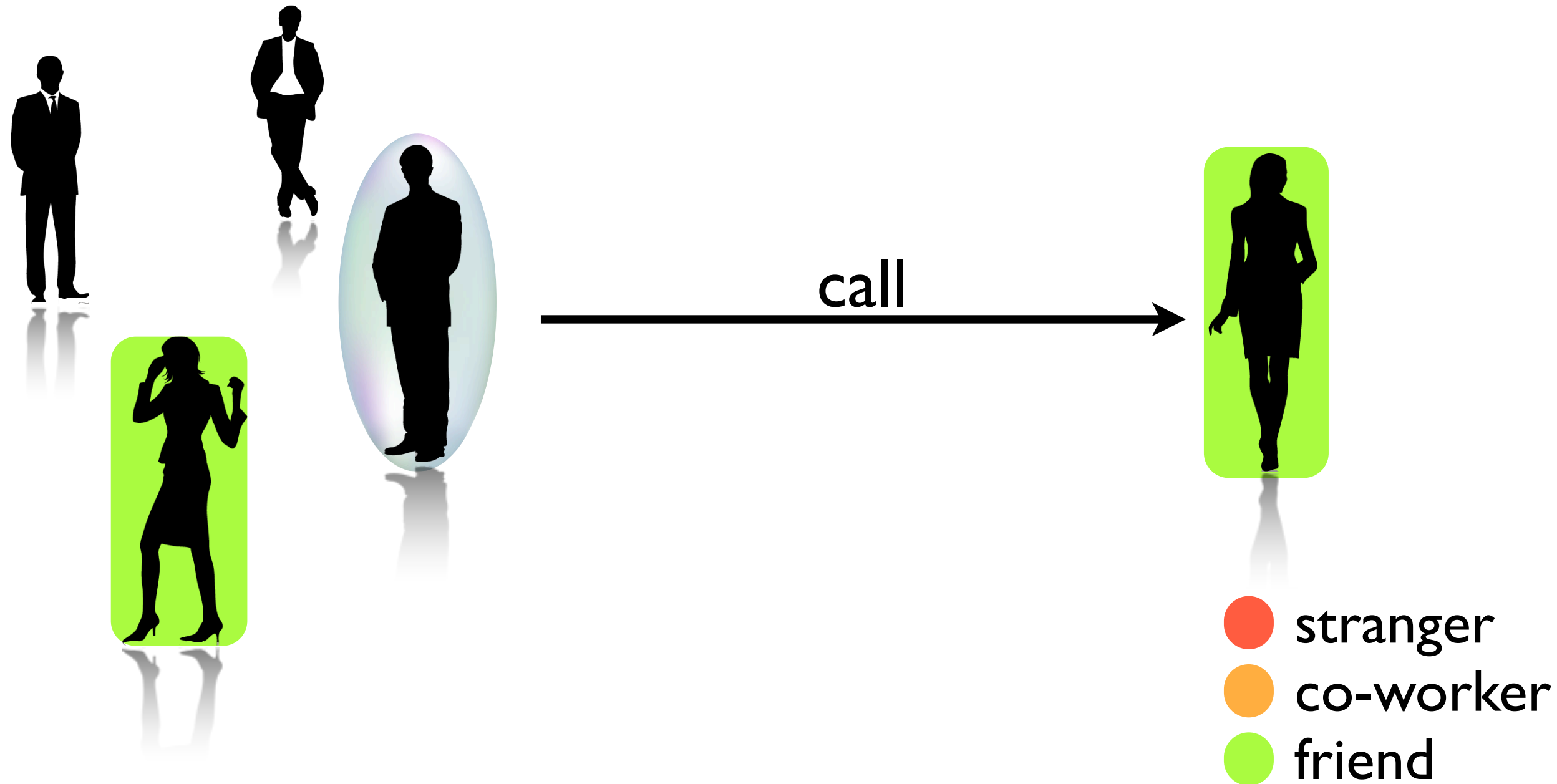
Outgoing Call/SMS

Observers



Outgoing Call/SMS

Observers



Outgoing Call/SMS

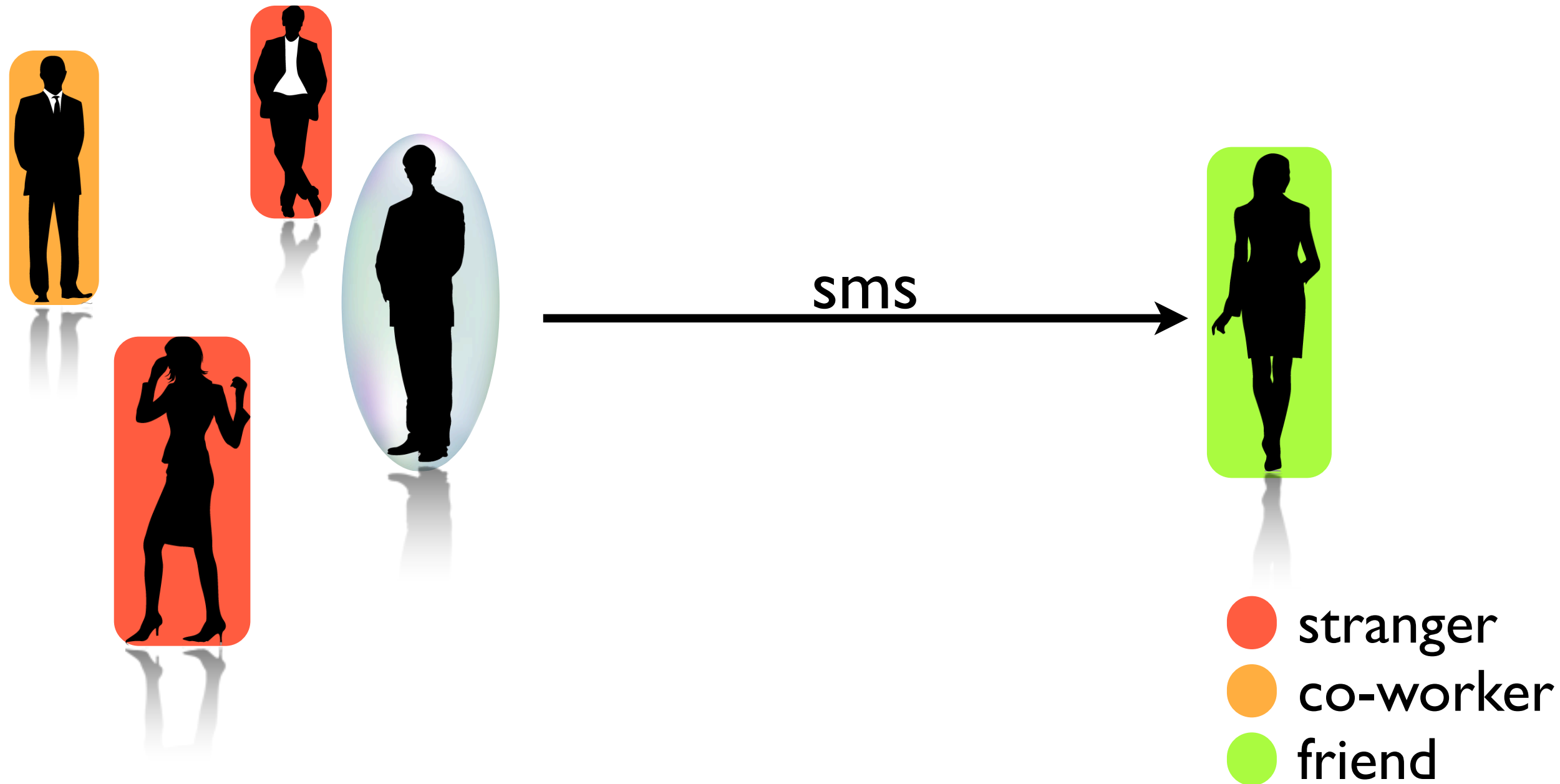
Observers



- stranger
- co-worker
- friend

Outgoing Call/SMS

Observers



Safe Places

Charging status

Safe Places

No charging	Charging
Park	Office
Shop	Home
Bus	Car
...	...

● not safe ● safe ● very safe (phone left when full)

Ring status

Safe Places



external perturbations

sms

call

...

Normal 🔊	Silent 🔇
Park	Office
Shop	Home
...	...

● not safe ● safe

Indoor / Outdoor

Safe Places

- Greedy assessment using GPS and WIFI data
 - **Outdoor** is assumed **unsafe**
 - **Indoor** is assumed **safe**

Intimacy Estimation algorithm

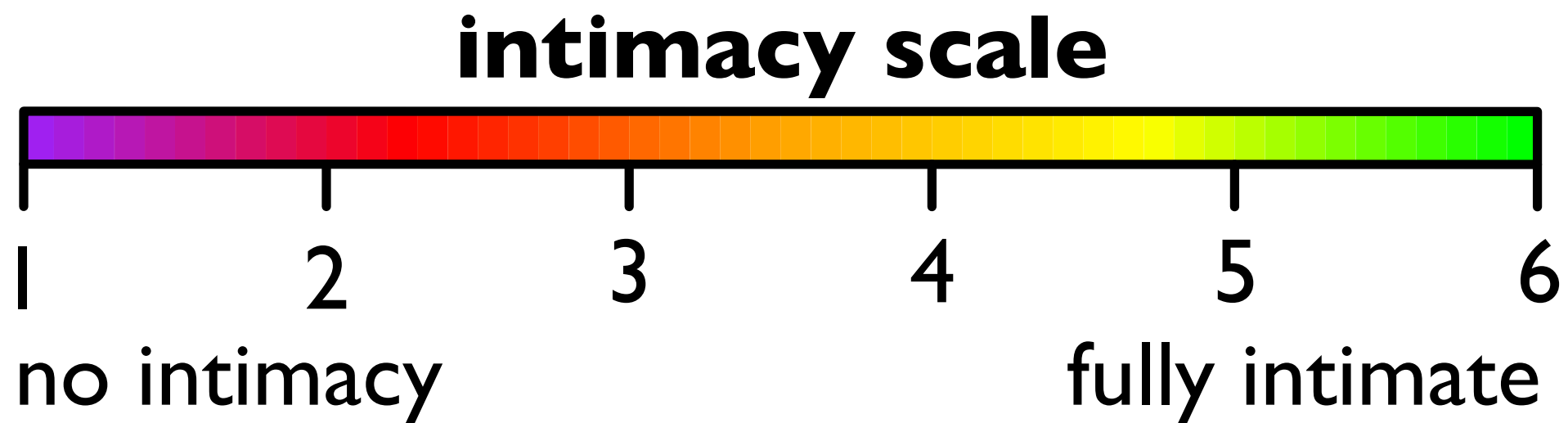
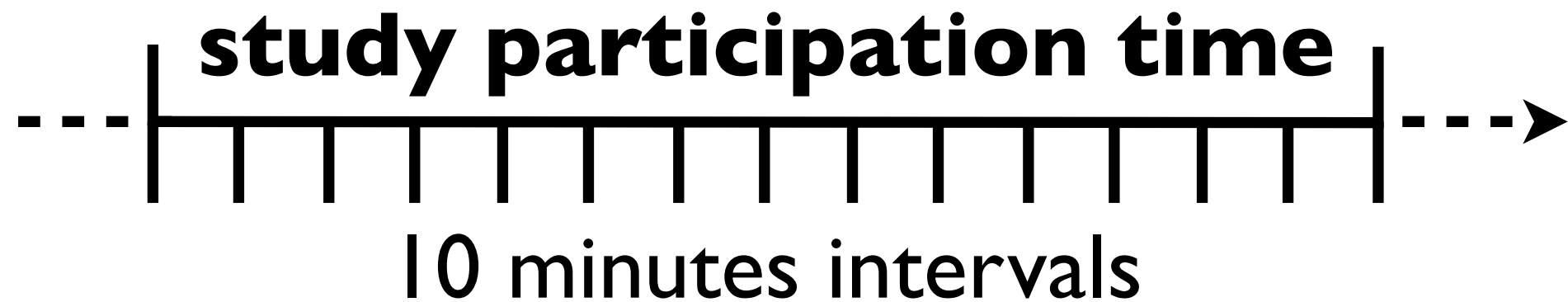
Intimacy Estimation algorithm

... **study participation time** ... →

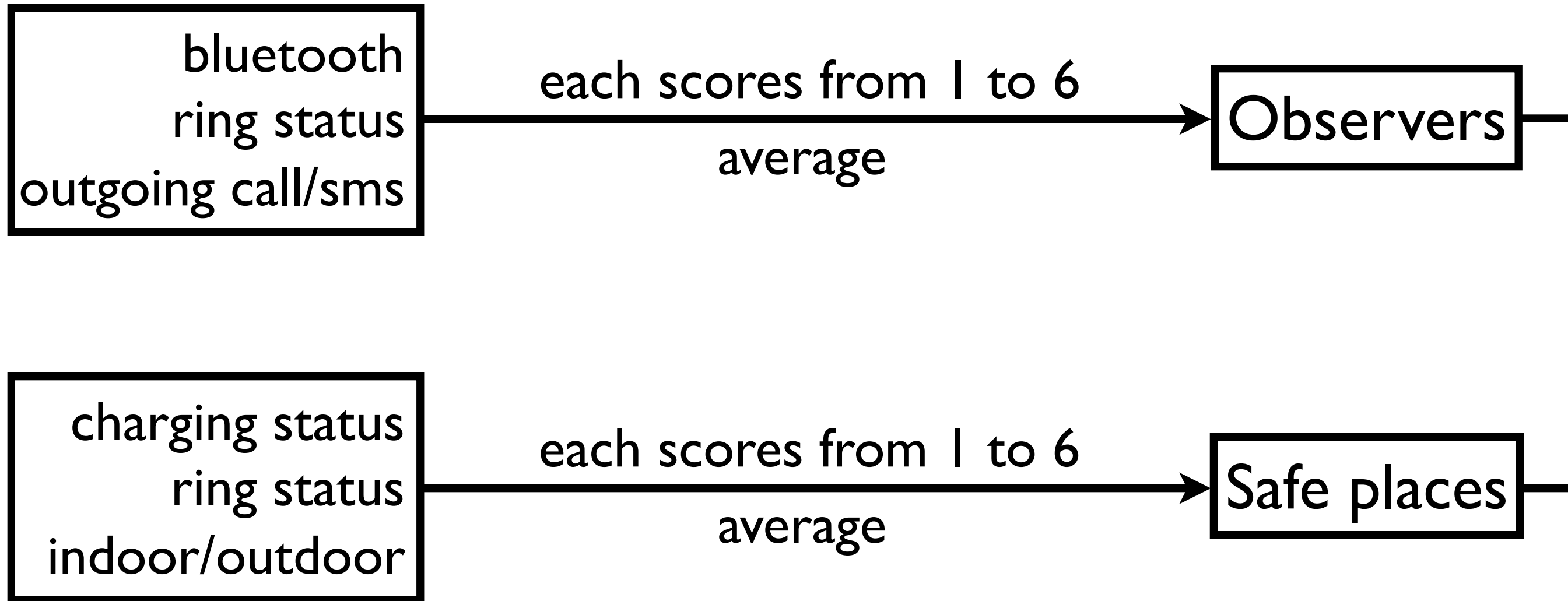
Intimacy Estimation algorithm



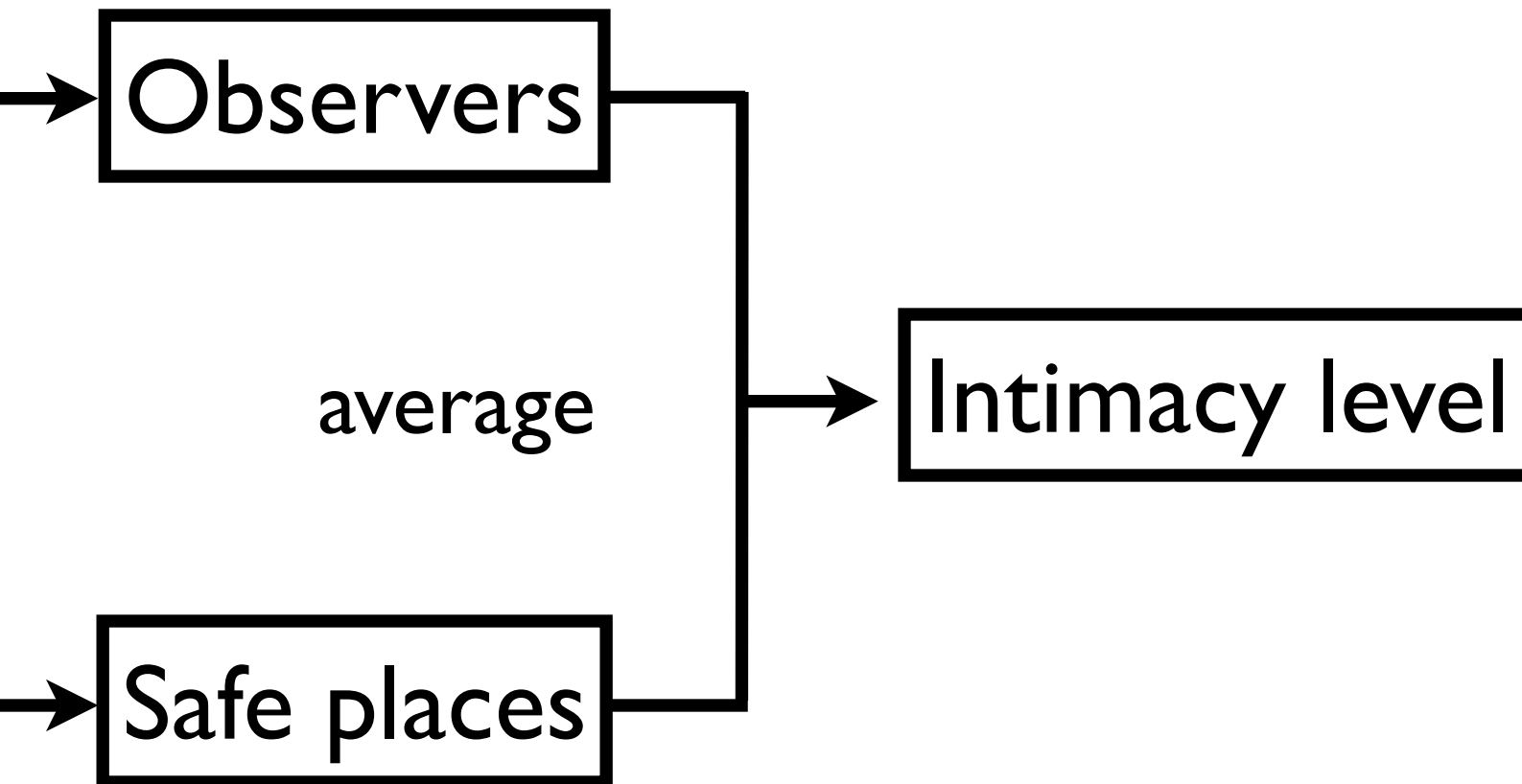
Intimacy Estimation algorithm



Intimacy Estimation algorithm

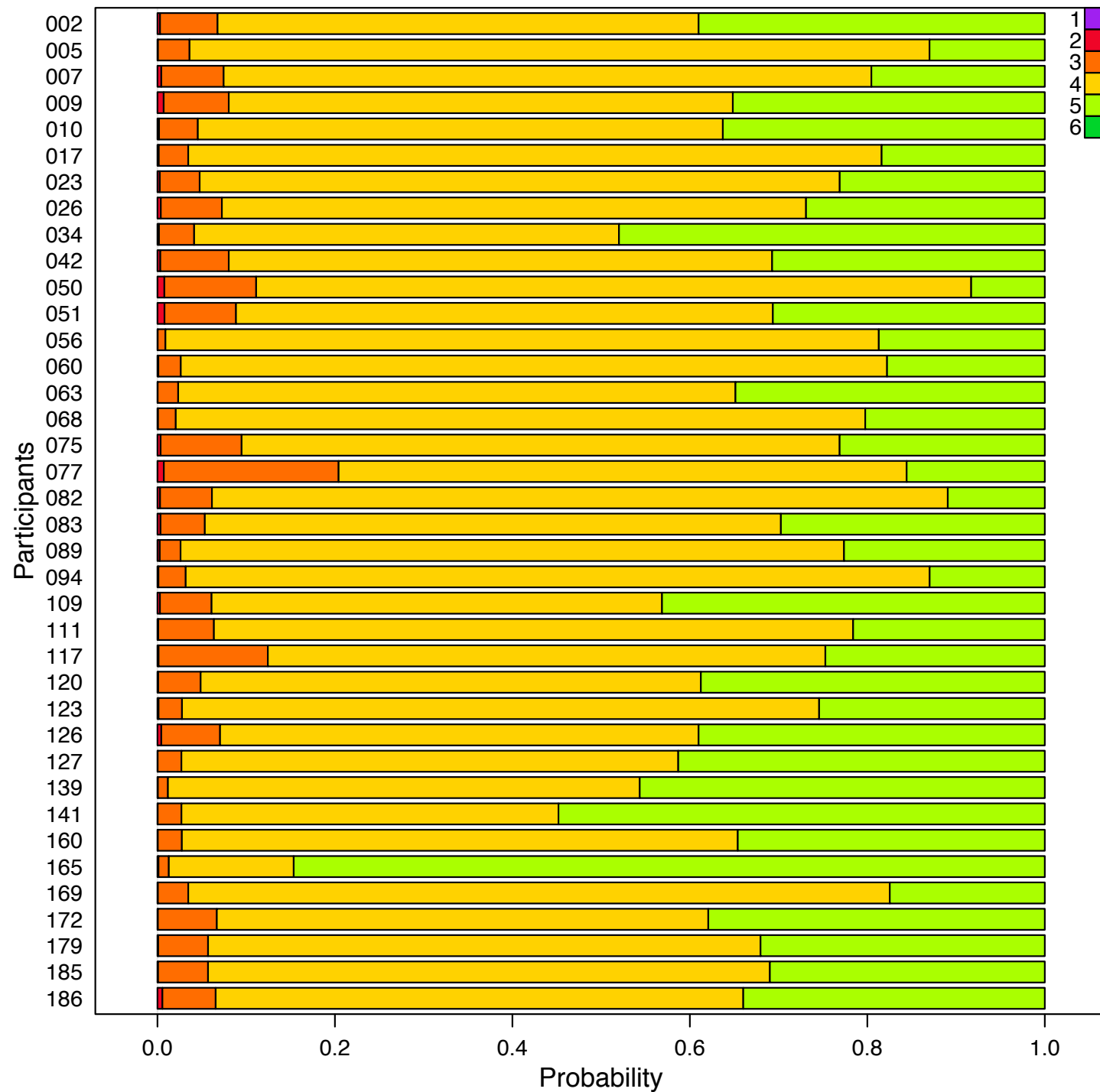


Intimacy Estimation algorithm

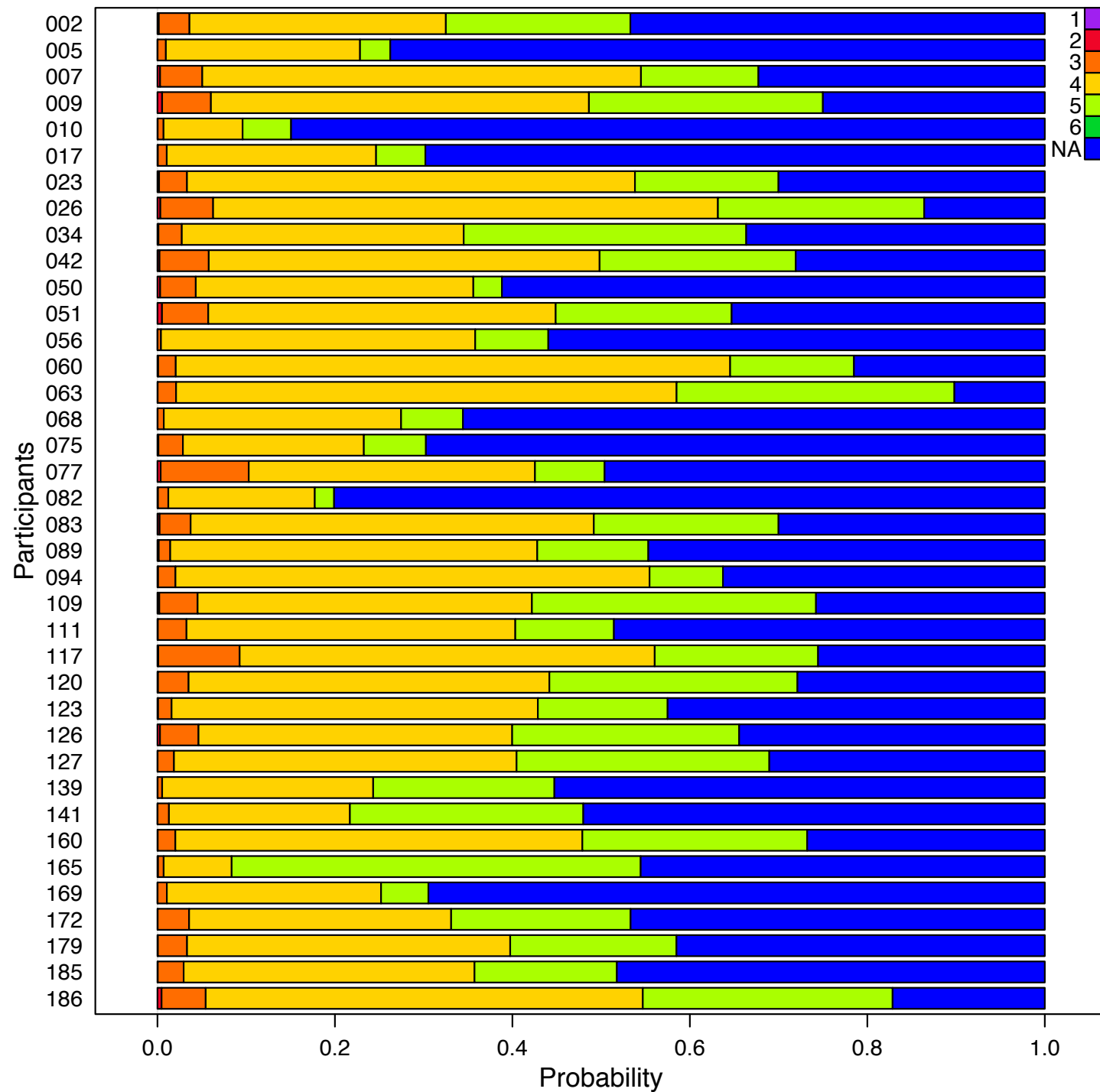


- Intermediate results are available for further analysis
- observers vs safe places
- single features

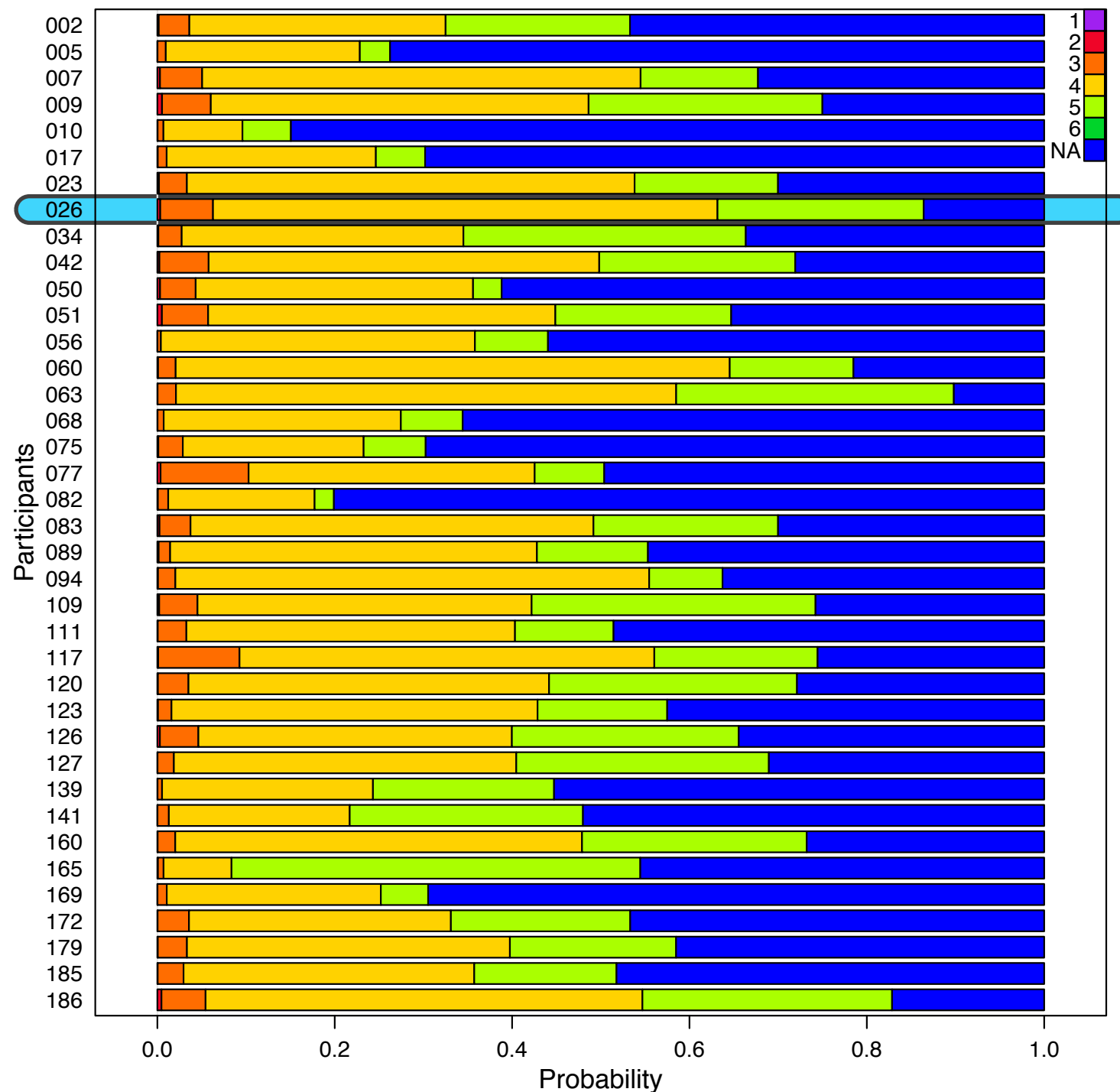
Results



Results

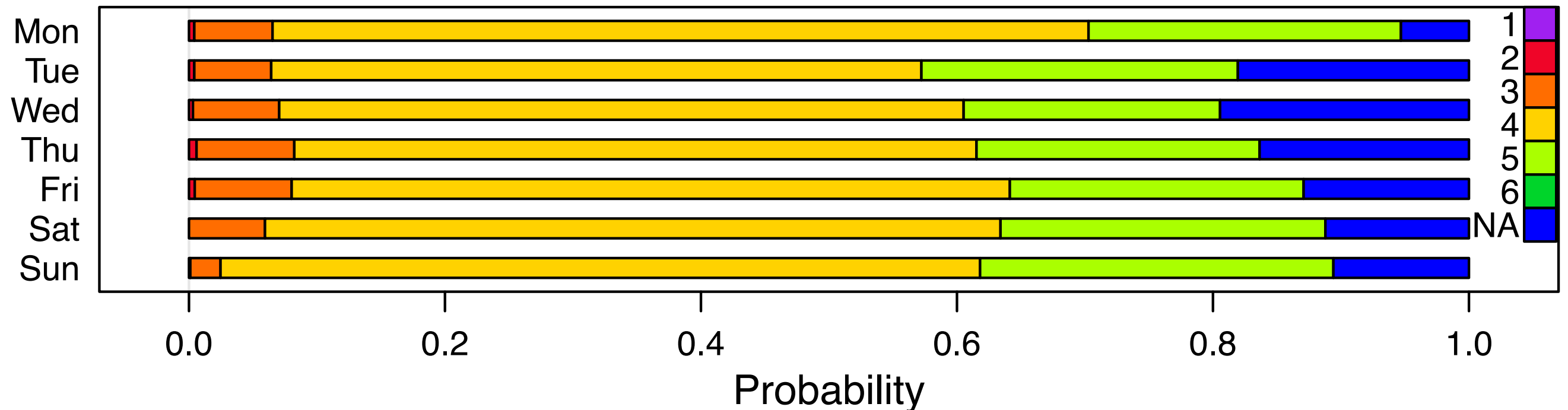


Results

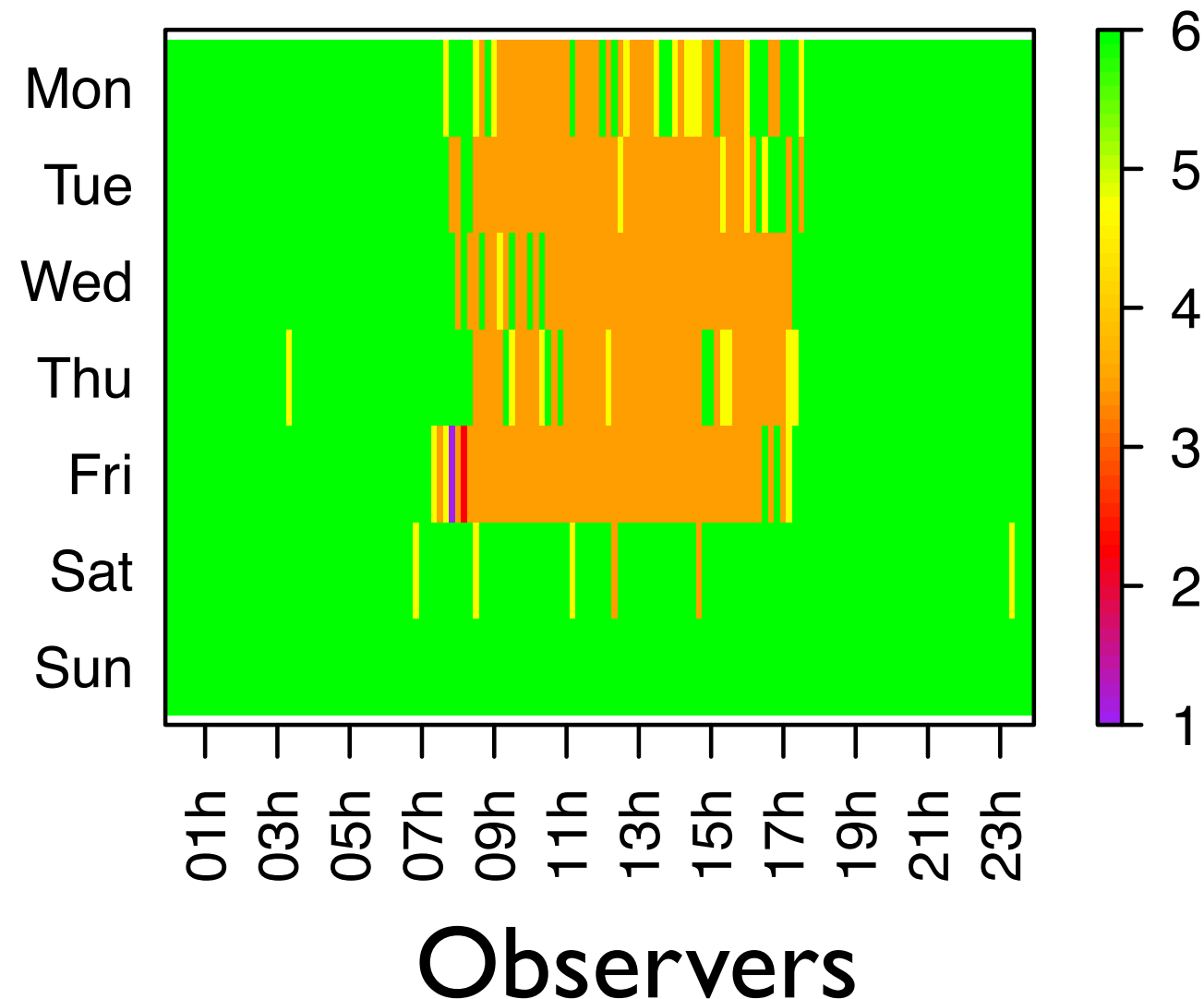


Results - P026

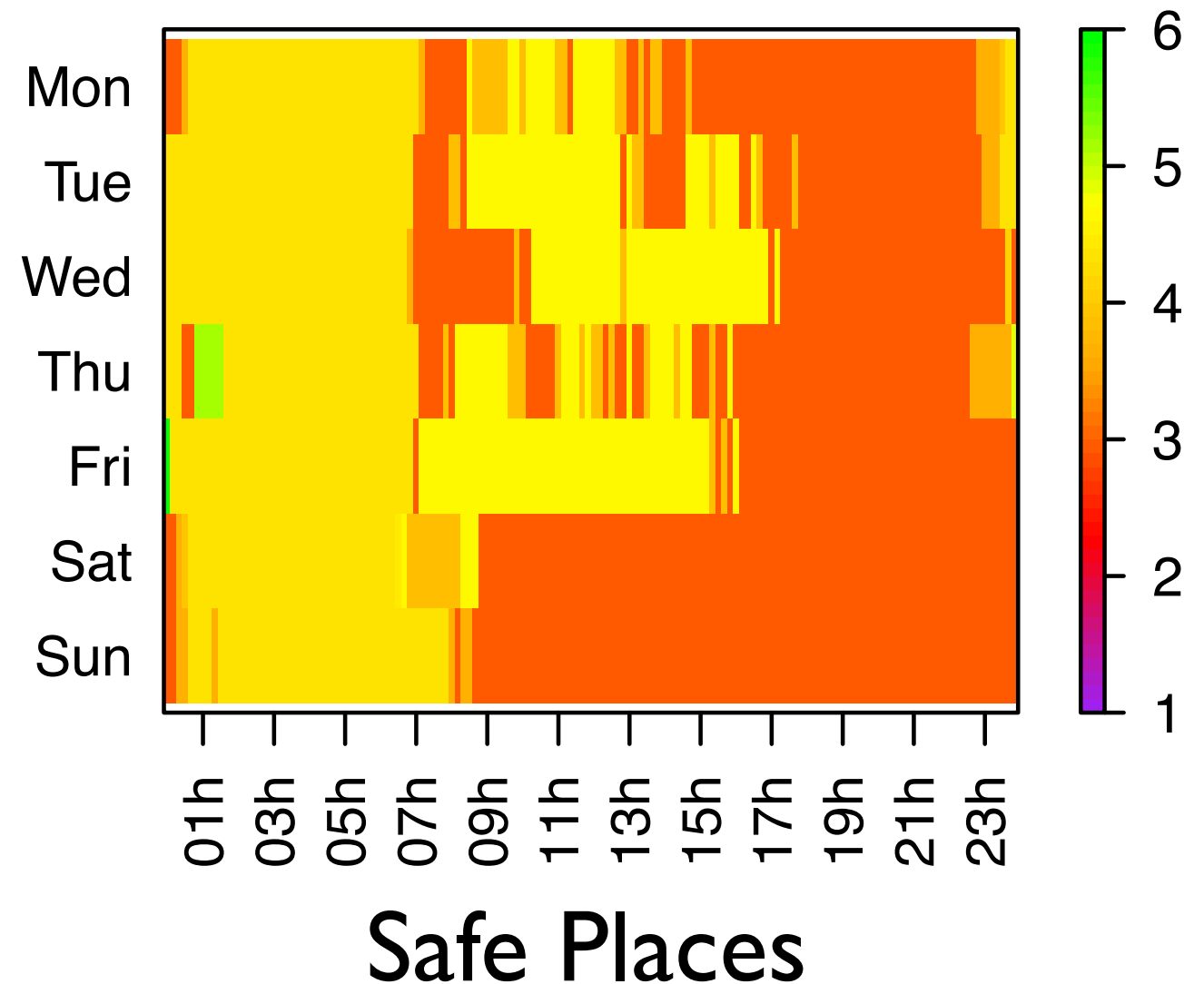
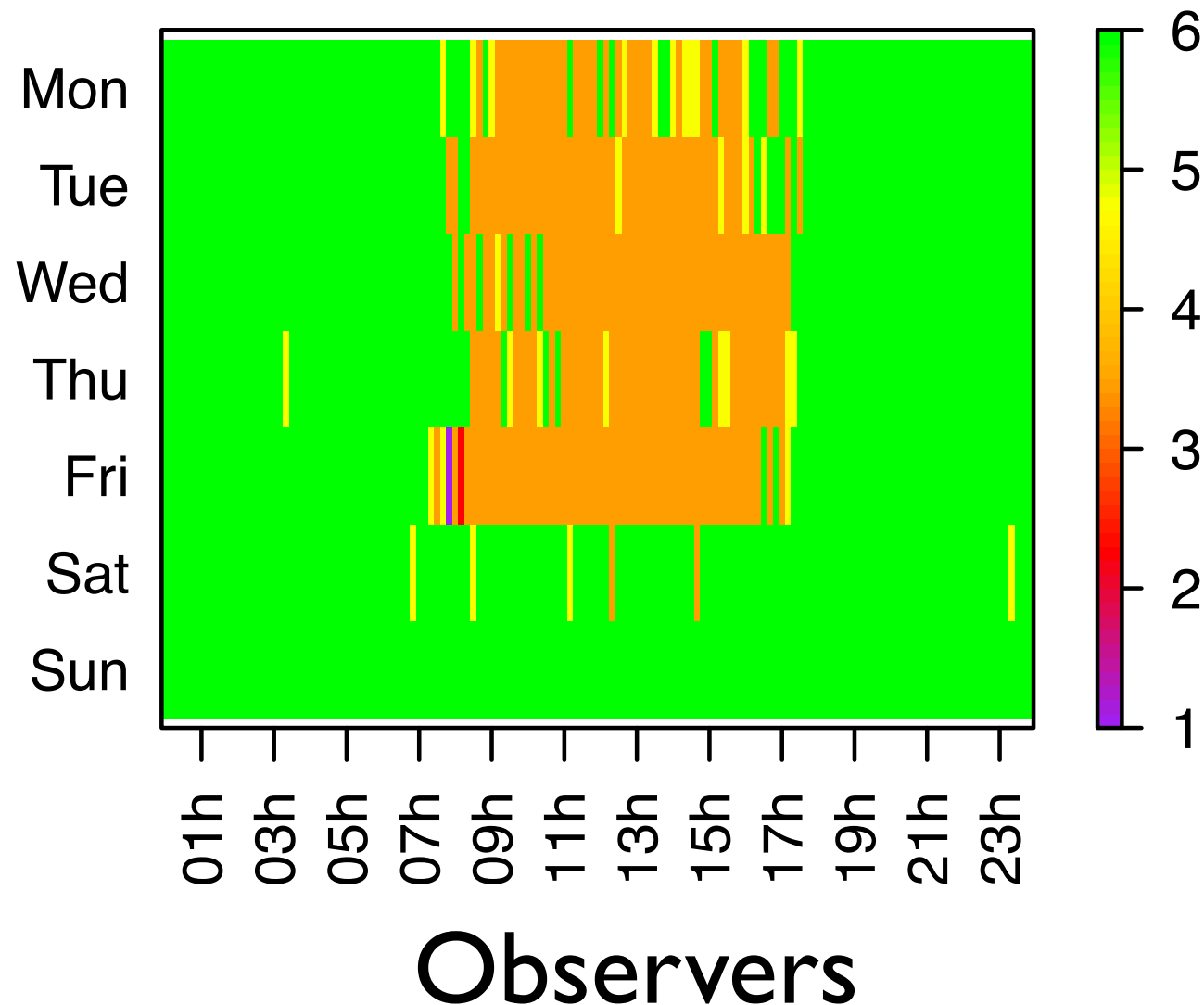
Female, 22-27, Student, 21 Weeks (147 days)



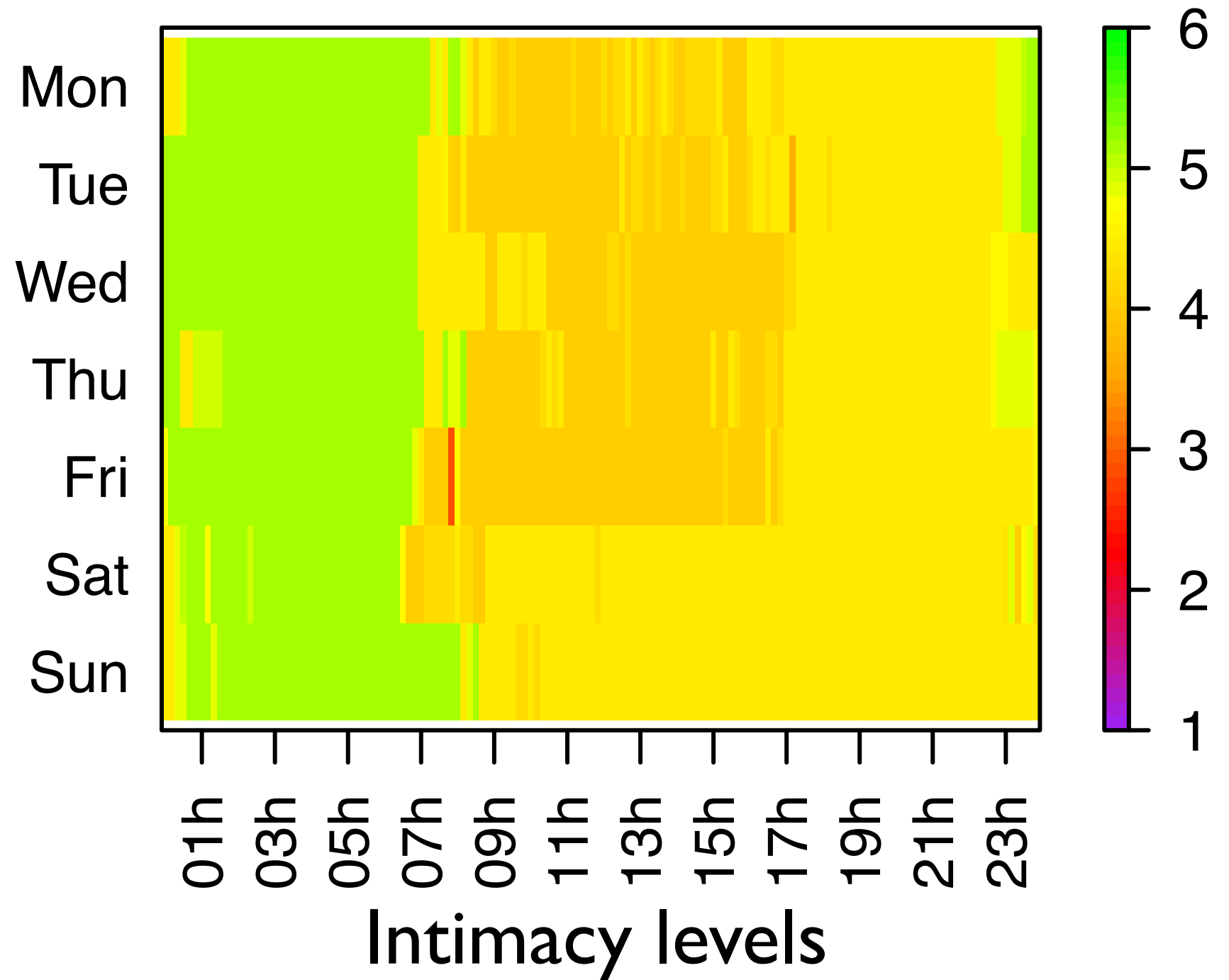
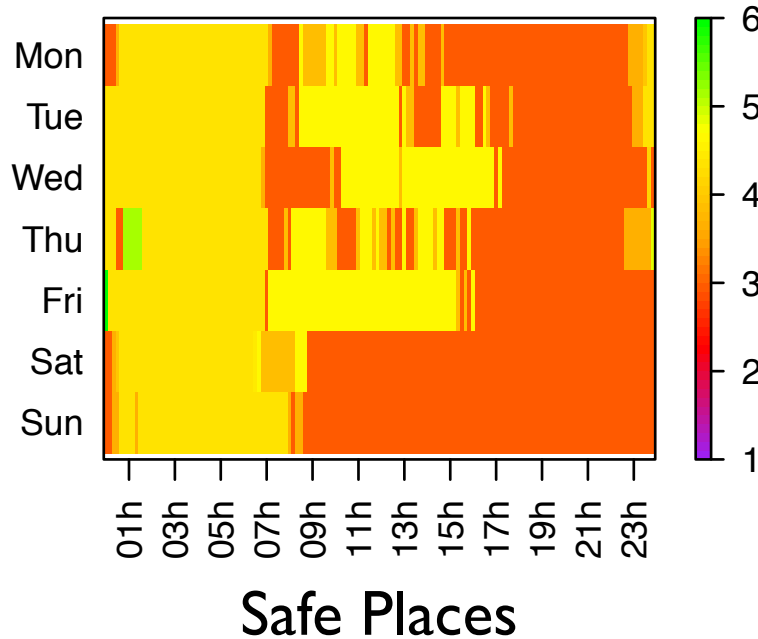
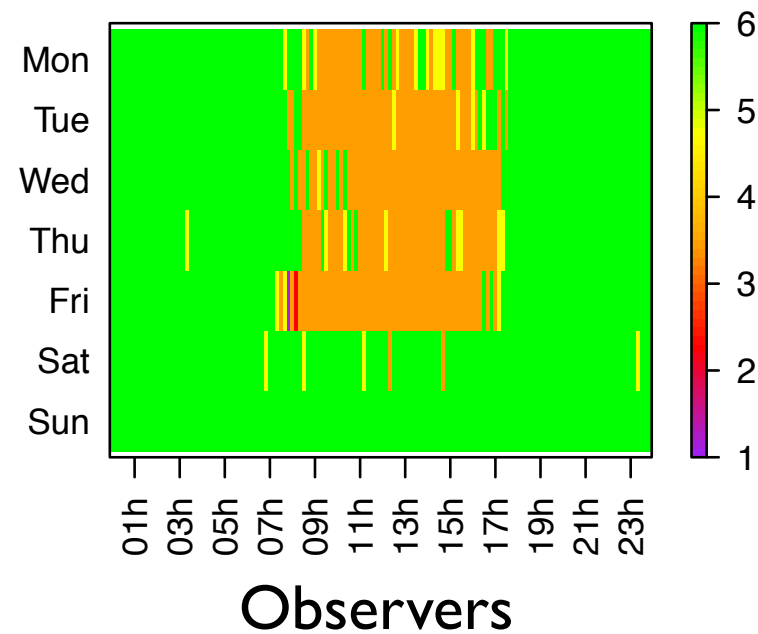
Results - P026



Results - P026



Results - P026



Limitations

- Several limitations on assumptions made for data analysis and intimacy levels estimation

Limitations

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- No ground truth available
 - to check the correctness of the approach
 - to verify assumptions
 - to explore more the data

Future work

- Collect ground truth
 - using Experience Sampling Method

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- Verify current assumptions and results

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- Explore new data to refine intimacy level estimation

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- Collect ground truth
 - using Experience Sampling Method
- Verify current assumptions and results
- Explore new data to refine intimacy level estimation
- *Apply automated sharing policies based on intimacy (verify that privacy is respected)*

Conclusions

- Introduction of the concept of intimacy in privacy management for context sharing

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- Greedy algorithm to estimate intimacy levels

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- Introduction of the concept of intimacy in privacy management for context sharing
- Greedy algorithm to estimate intimacy levels
- First results showing that intimacy levels may follow precise patterns

Thank you!

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