



# Visualisation of Affordances

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Presentation of M1.1 project  
September 15, 2014

# Presentation

- **Why** do I want to visualise interaction?
- **How** did I approach this?
- **What** is my visualisation?
- Extra: things to consider in visualisations

**Why?**

# Visualisation for interaction design

- **Product:** sketches, CAD models, Arduino
- **User:** personas, measurements
- **Context:** cultural probes, context mapping
- **Interaction:** Frogger framework (abstraction), video (limited trace)

**TINKERING**

**ENGINEERING**

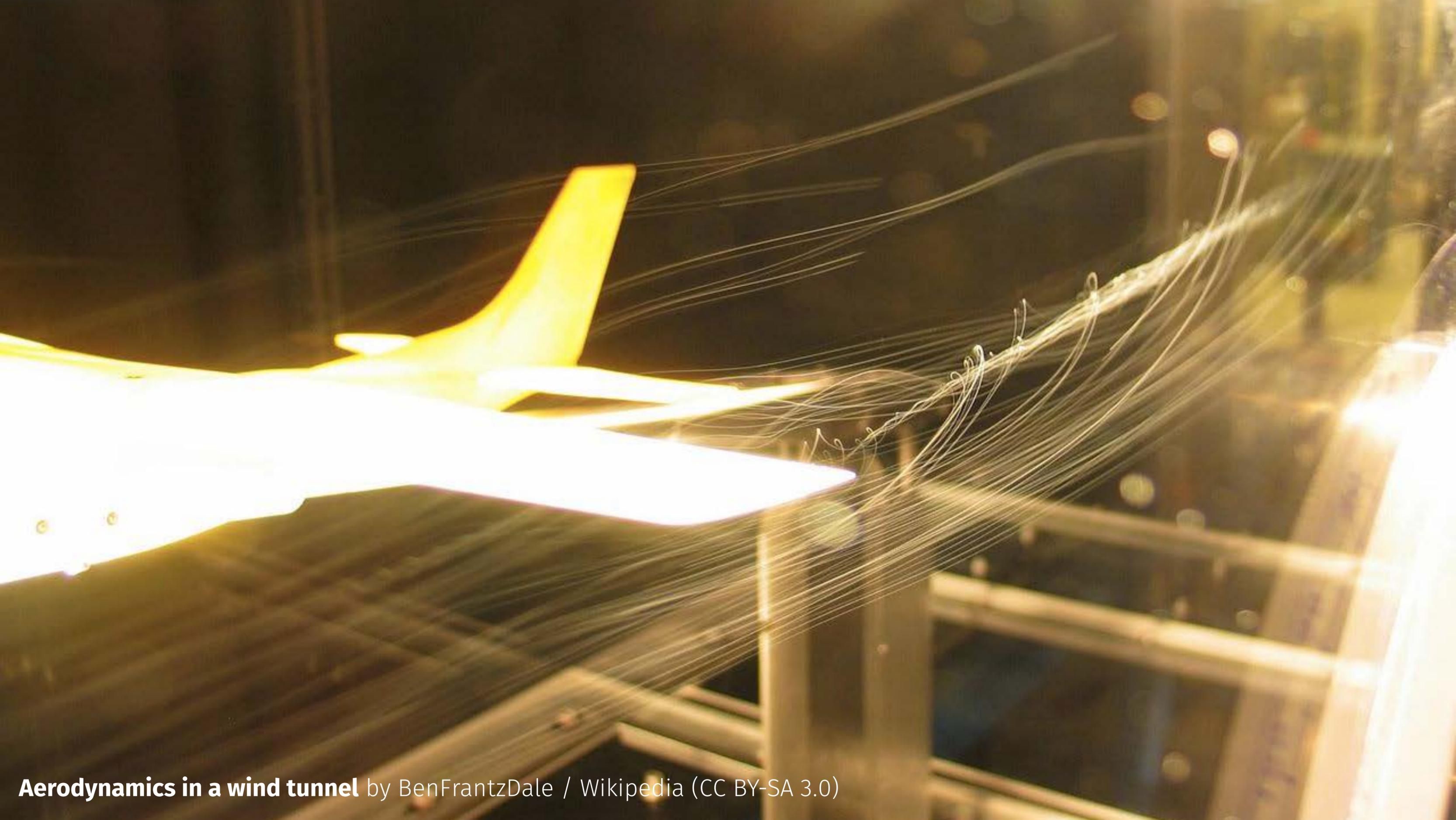
**SCIENCE**



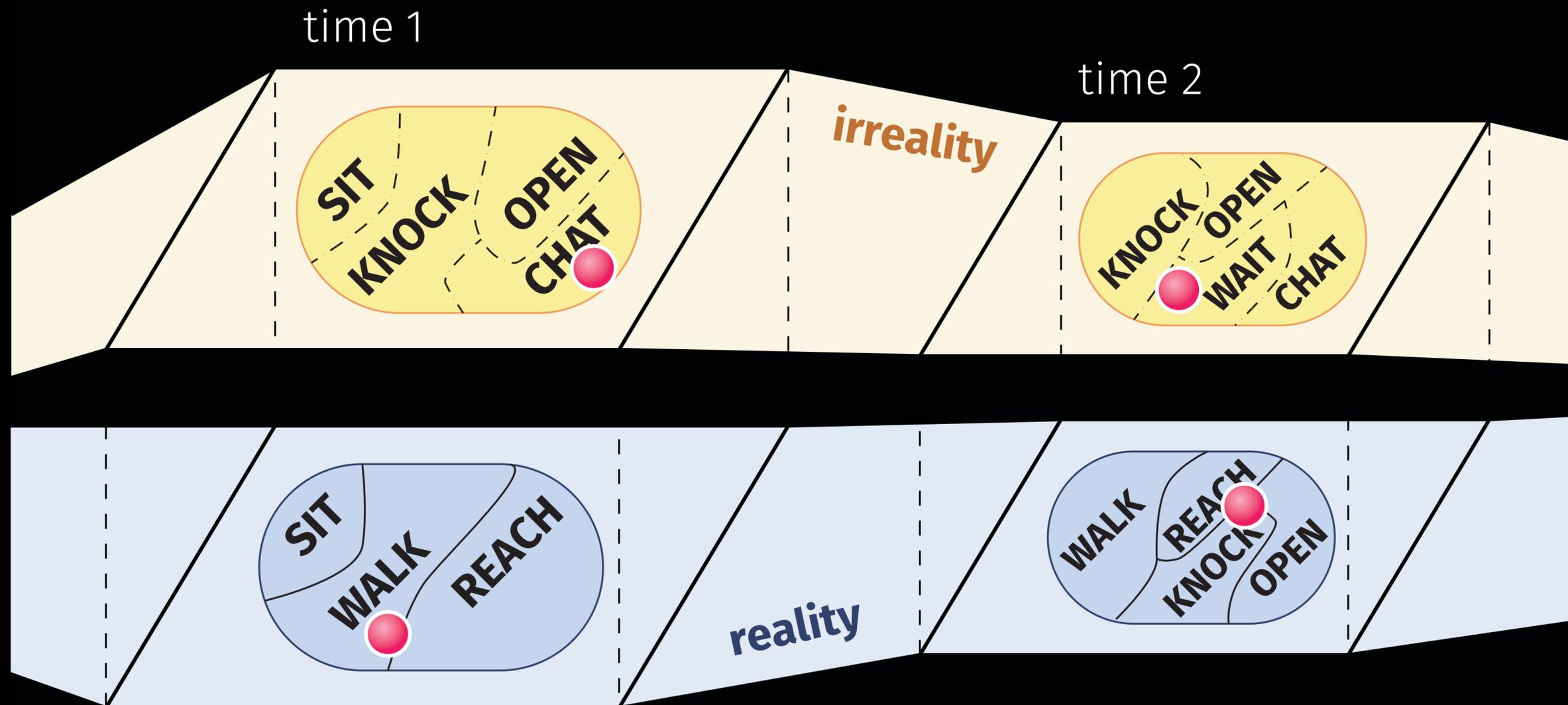
**WITH BUILDING TOOLS**

**AND CONCEPTUAL TOOLS**

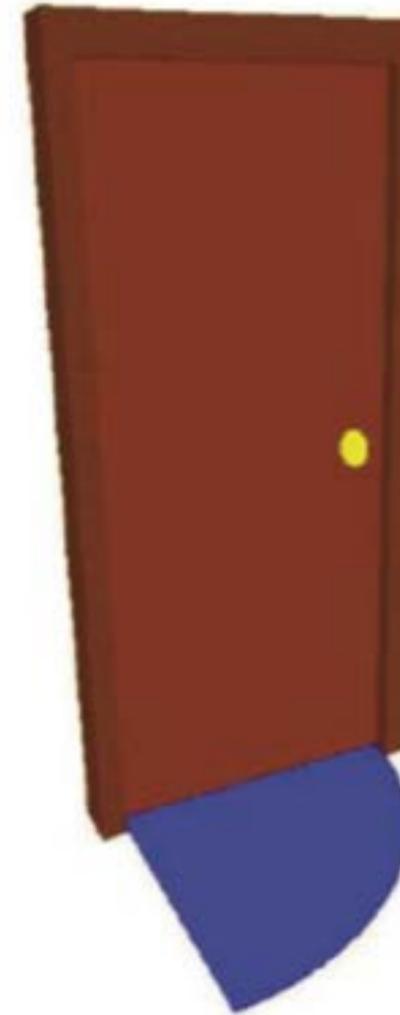
**AND SEEING TOOLS**



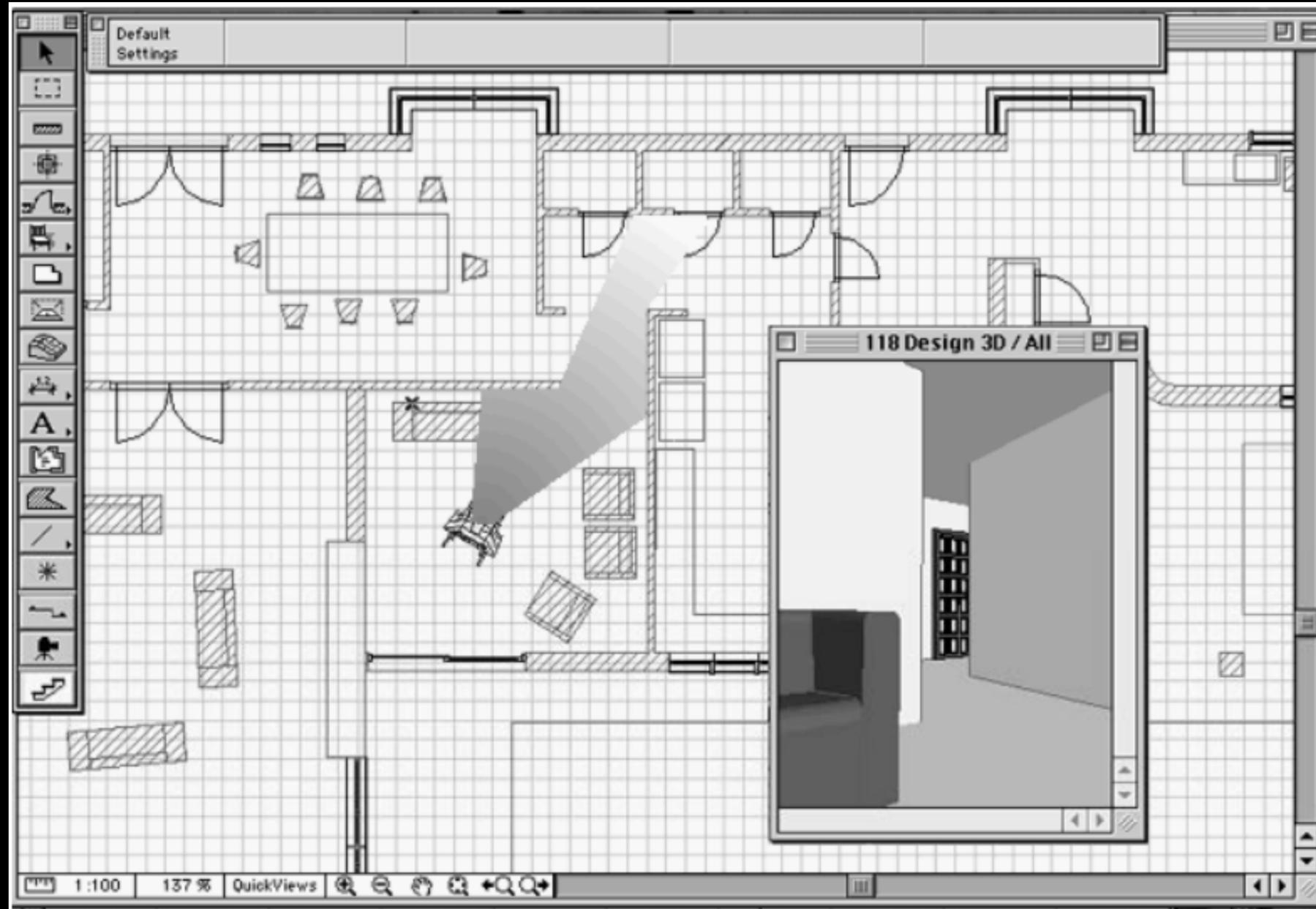
**Aerodynamics in a wind tunnel** by BenFrantzDale / Wikipedia (CC BY-SA 3.0)



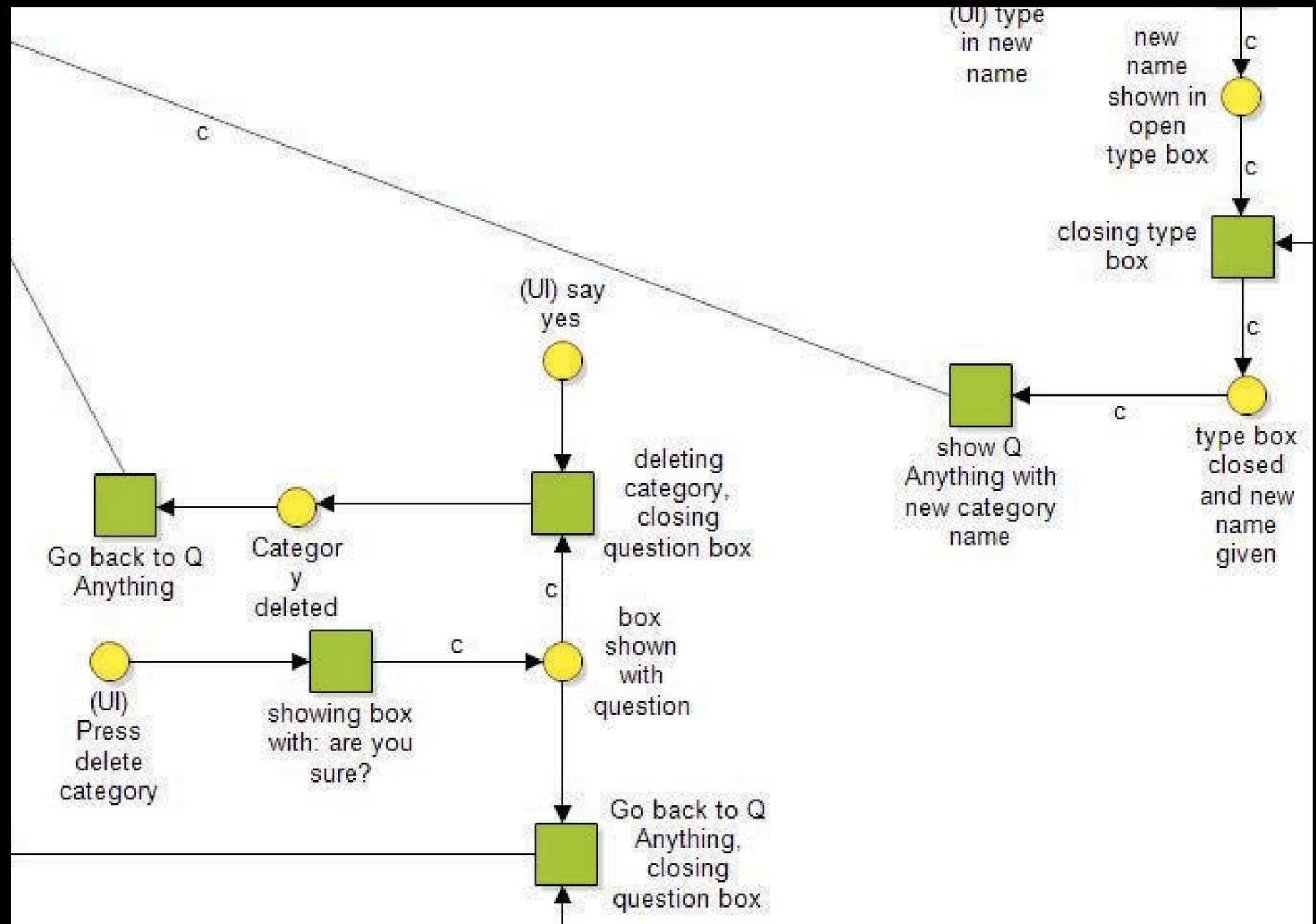
**Visualisation of 'life space'.** Inspired by: Lewin, K. (1939). Field theory and experiment in social psychology: Concepts and methods. American journal of sociology, 868-896.



**Interaction and influence surfaces.** Badawi, M., & Donikian, S. (2007). The generic description and management of interaction between autonomous agents and objects in an informed virtual environment. *Computer Animation and Virtual Worlds*, 18(4–5), 559-569.



**Describing dynamic perceptual environments.** Tweed, C. (2001). Highlighting the affordances of designs. In *Computer Aided Architectural Design Futures 2001* (pp. 681-696). Springer Netherlands.



**Petri nets.** See e.g. Murata, T. (1989). Petri nets: Properties, analysis and applications. Proceedings of the IEEE, 77(4), 541-580.

**How to visualise interaction?**

## **How to visualise interaction?**

(dynamic, intangible, personal)

**How?**

# Requirements

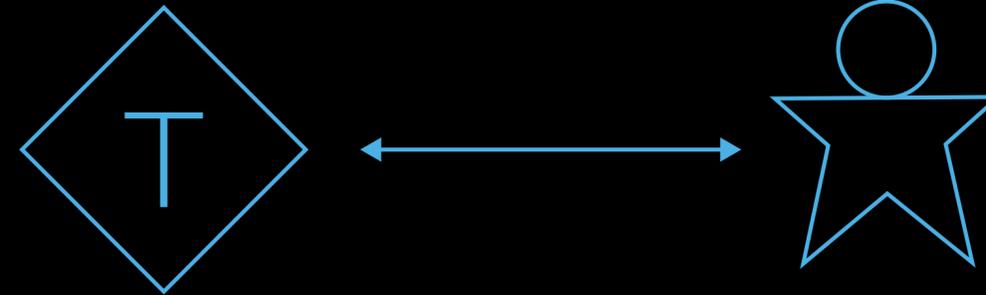
- Theoretically OK
- Useful for design (research)

# Affordances



= possible actions an organism perceives in relation to their environment (~ Gibson)

# Affordances

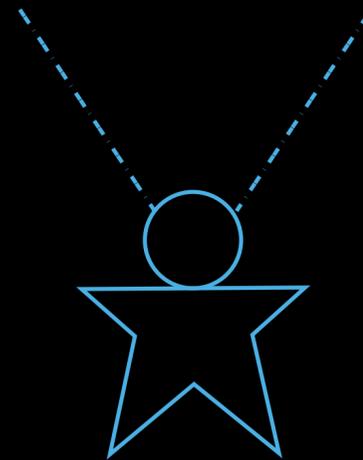


## Environmental perspective

“I offer the possibility to turn on the light by the touch of a hand.”  
(*< effect >*, *< ( < agent >*, *< behaviour >* ))

## Agent perspective

“I can get more light by touching such a surface.”  
(*< effect >*, *< (entity, behaviour) >*)



## Observer perspective

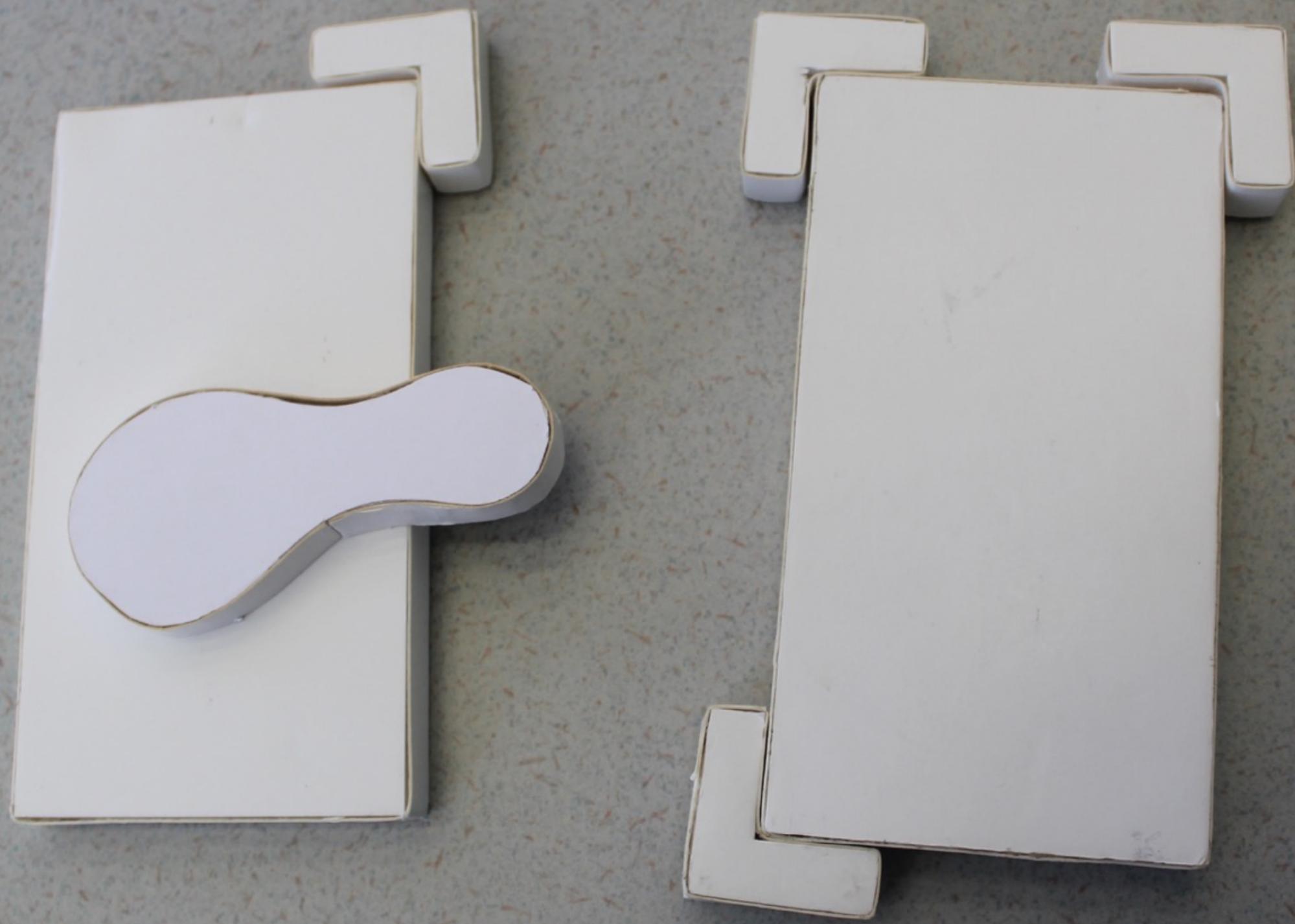
“The light can be turned on by such people touching such surfaces.”  
(*< effect >*, *( < agent >*, *< (entity, behaviour) >* ))

# Use cases for seeing affordances

- **Education:** what are affordances (not)?
- **Simulation:** iterate more quickly by testing prototype variations.
- **Qualitative research:** compare interpretations by sketching.
- ...
- **Design:** sketch the affordances first, the product second.
- **Sharing insights:** library of affordances?

**What?**

“Design a remote control for a growing multimedia system.”

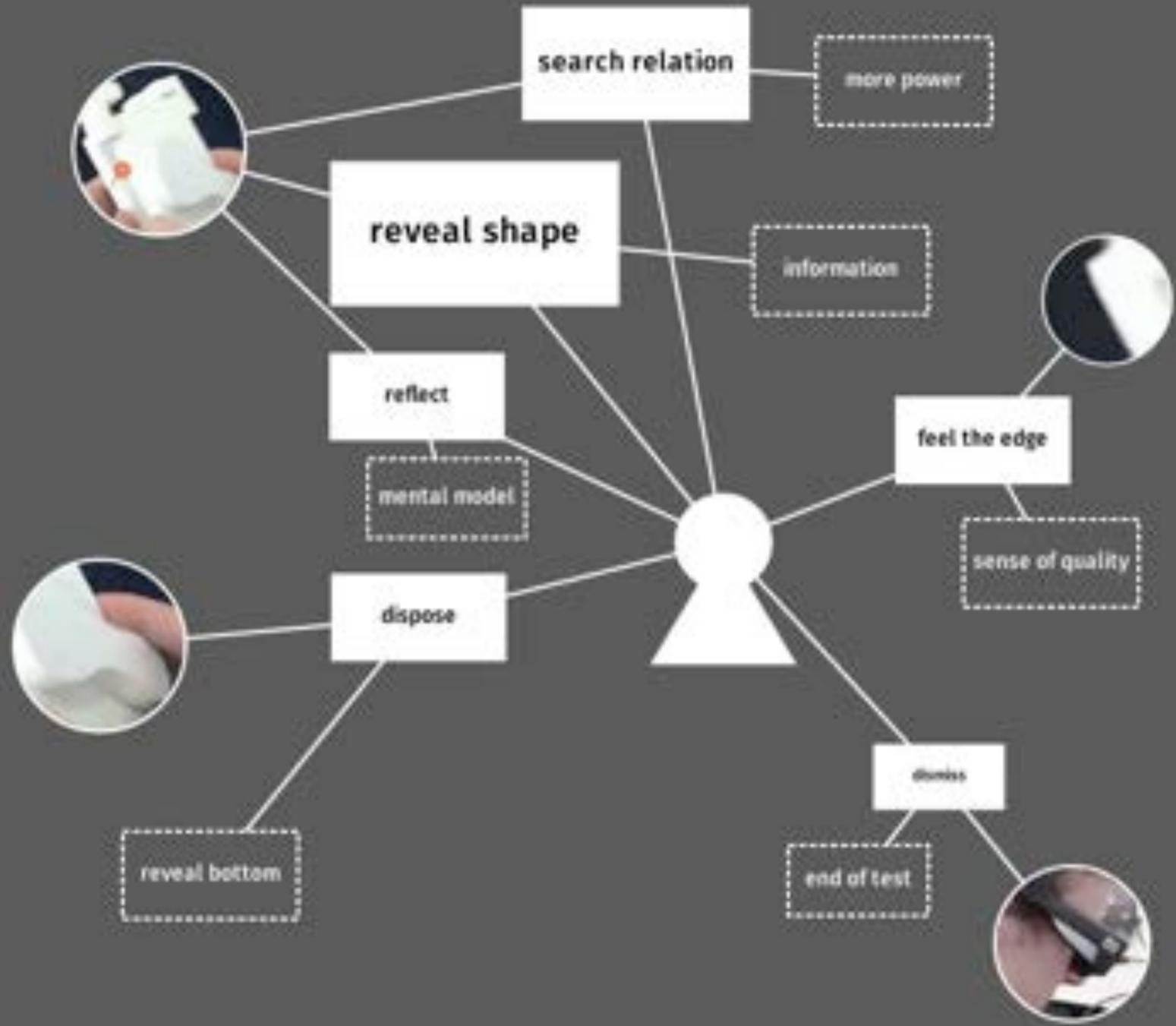


Exploratory prototype by Jordy Rooijackers (2014).









# Visualisation of affordances



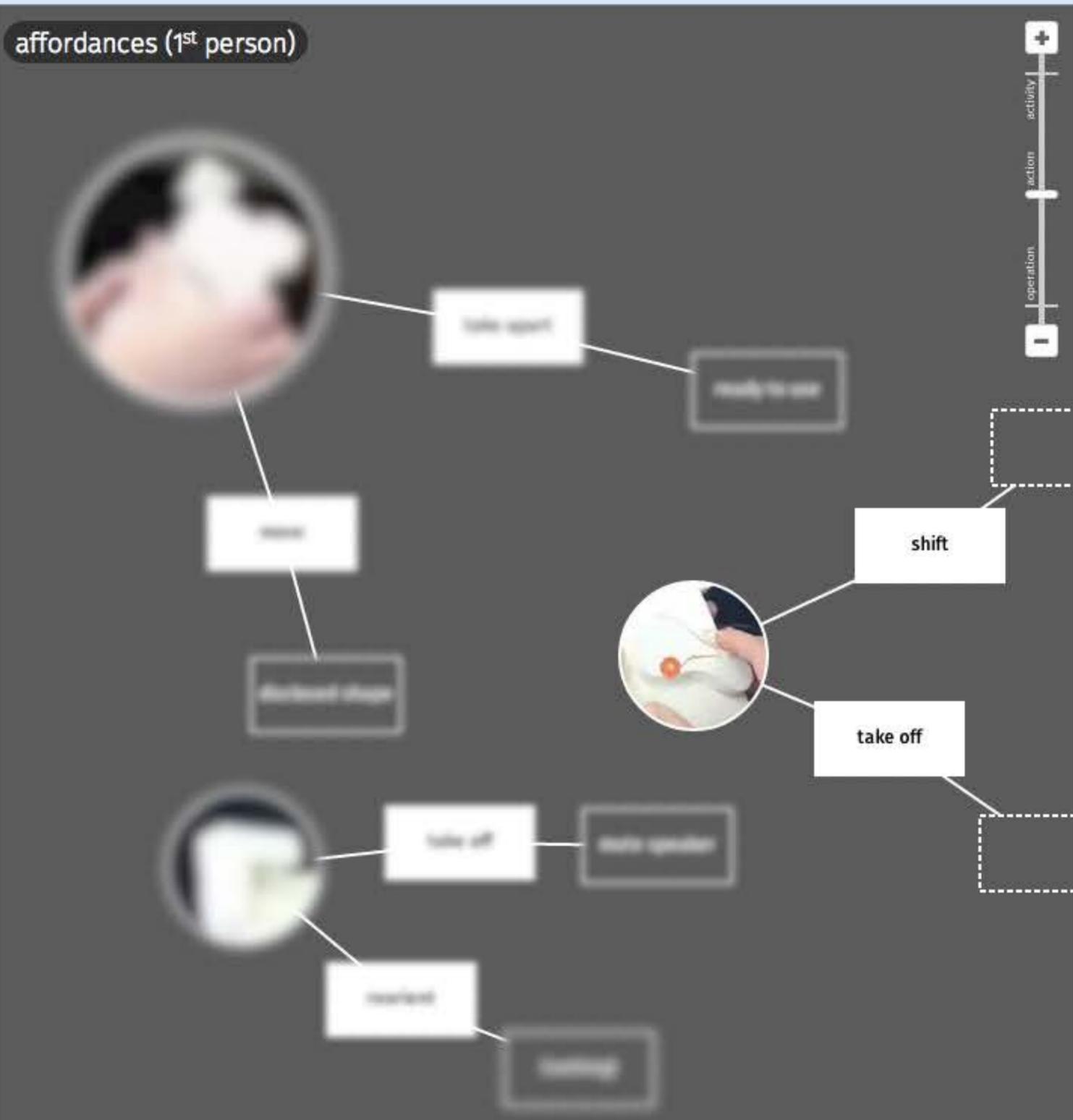
3<sup>rd</sup> person



1<sup>st</sup> person



affordances (1<sup>st</sup> person)





1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

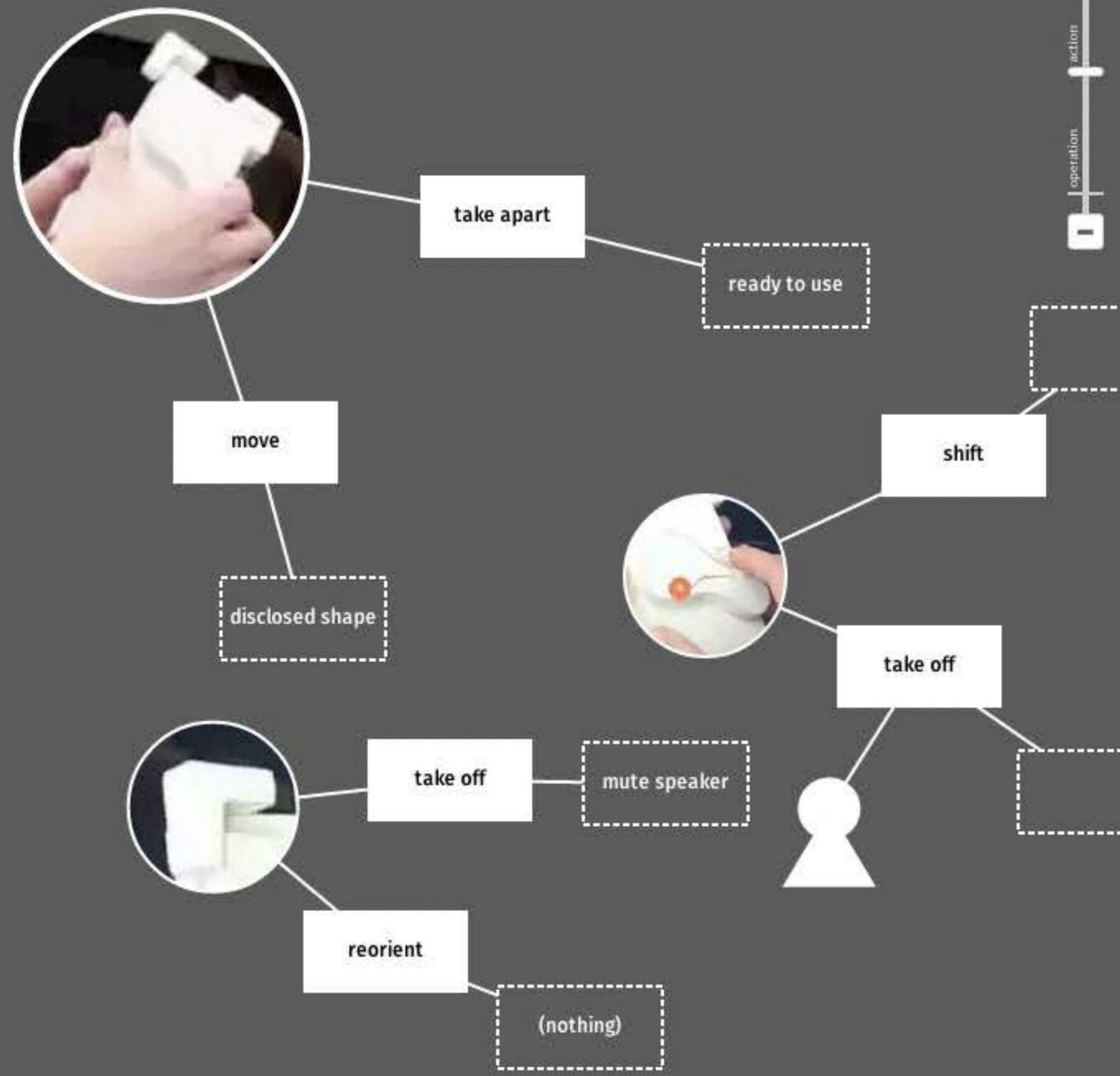
3<sup>rd</sup> person



1<sup>st</sup> person

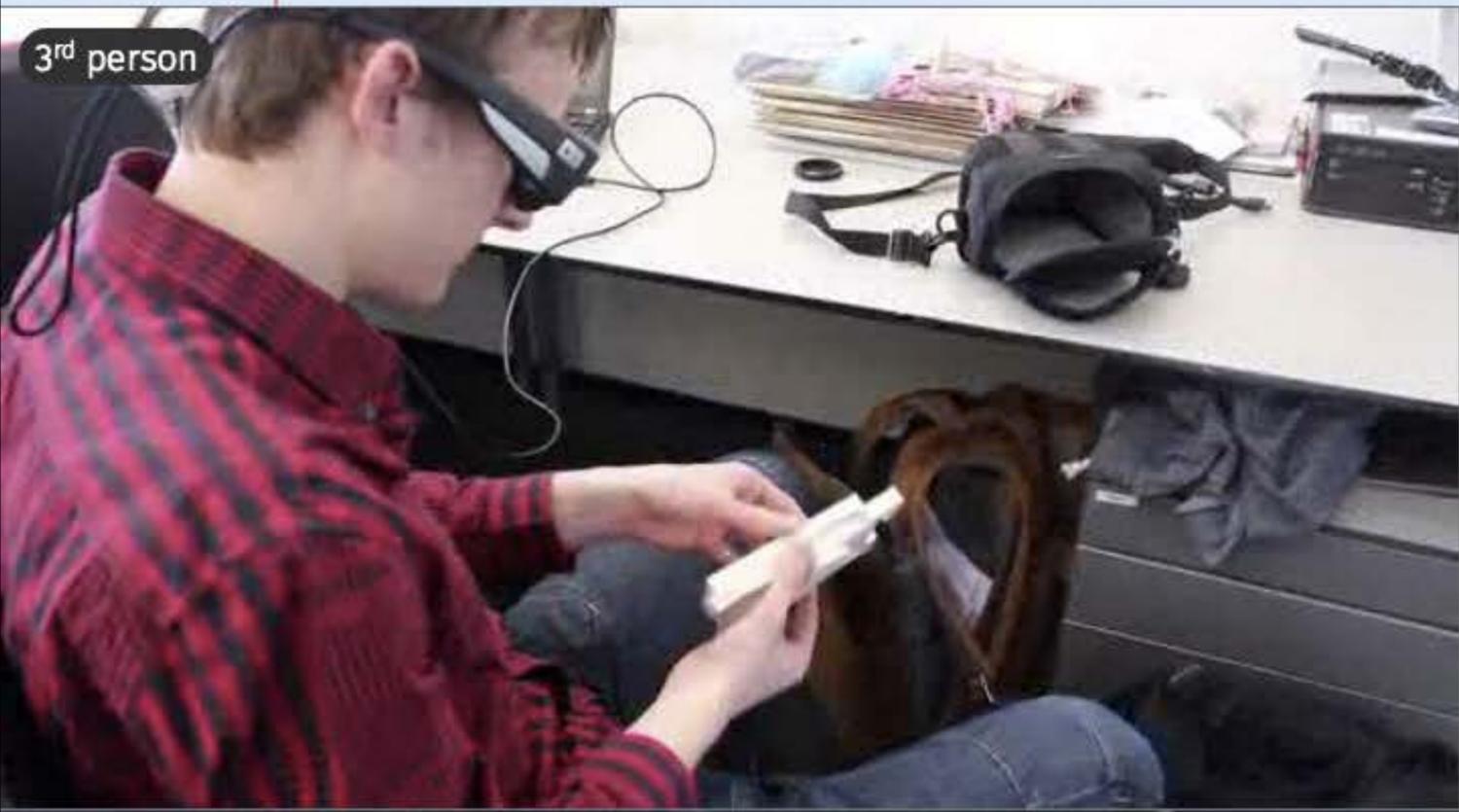


affordances (3<sup>rd</sup> person)

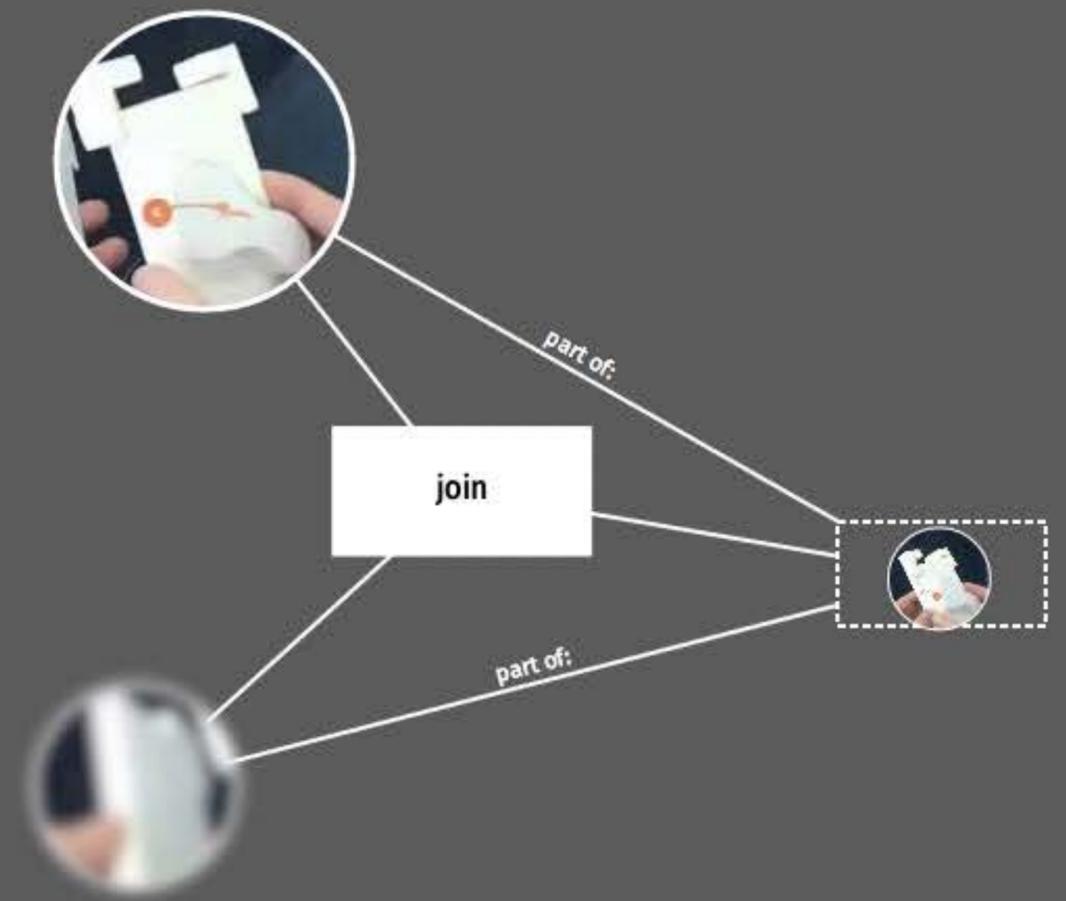


operation  
action  
activity

legend: ○ entity □ behaviour ▭ effect 👤 agent



affordances (1<sup>st</sup> person)



# Considerations

# Visualising the lived world

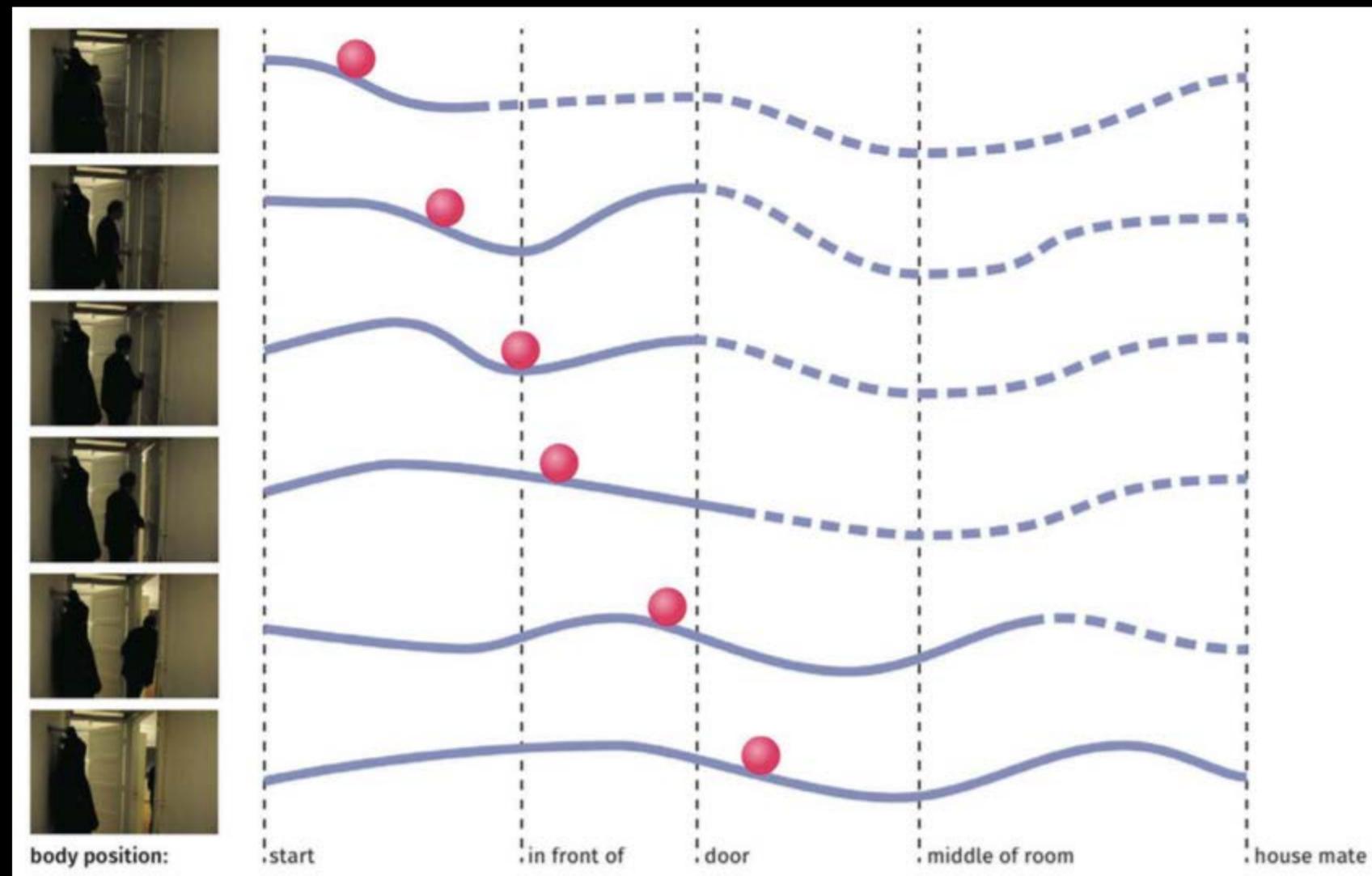


# Attensity of affordances



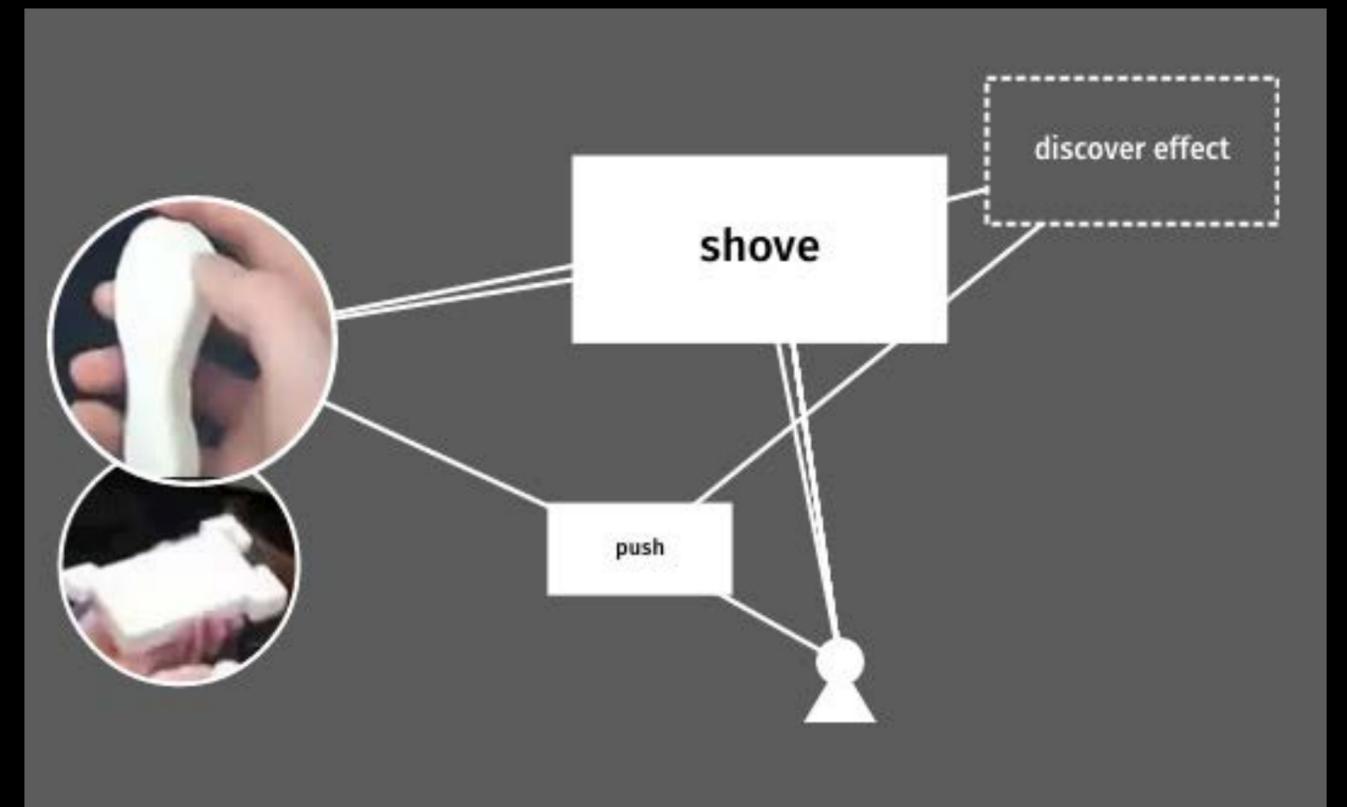
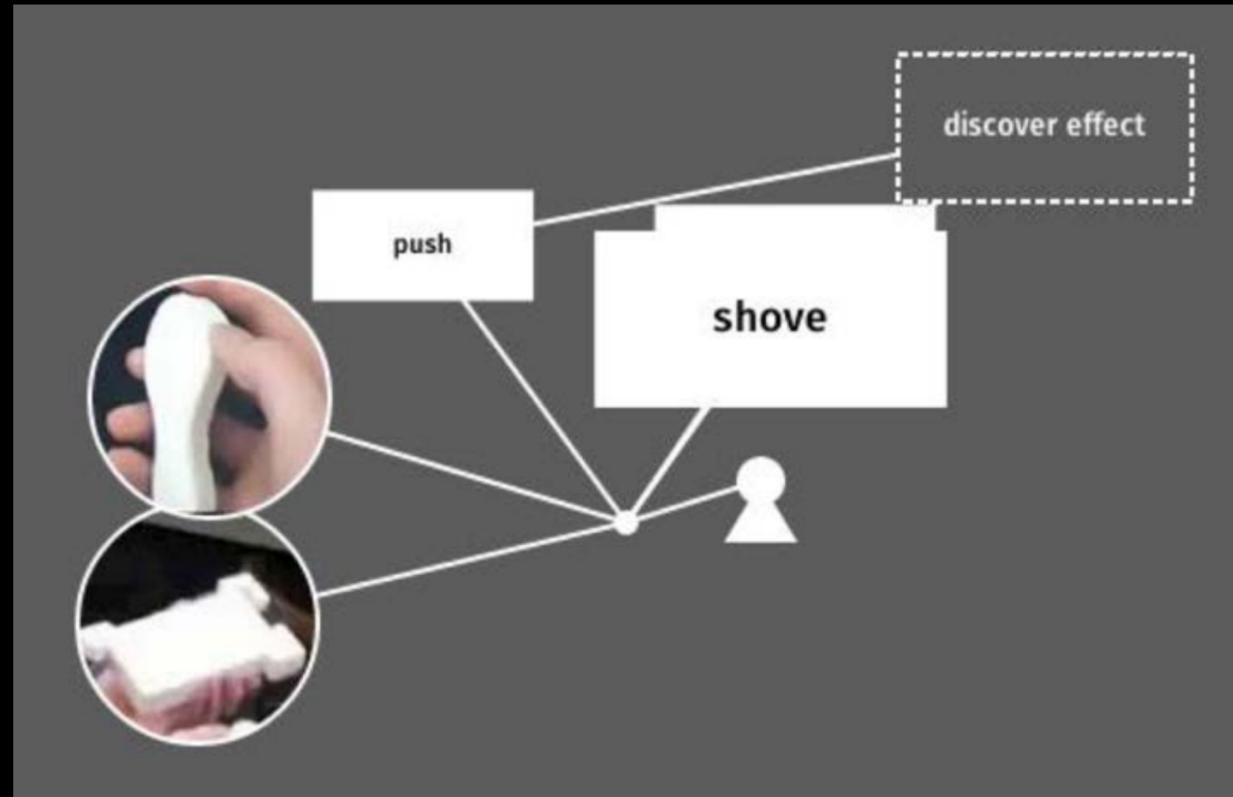
Shaw, R. E., McIntyre, M. & Mace, W. M. (1974). The Role of Symmetry in Event Perception. In R. B. McLeod & H. Pick, Jr., Perception: Essays in Honor of James J. Gibson. Pages 276 - 310. Ithaca, NY: Cornell University Press

# Abstract representations



Inspired by: Thelen, E., & Smith, L. (1994). *A dynamic systems approach to the development of cognition and action*. Cambridge, MA, USA: MIT Press.

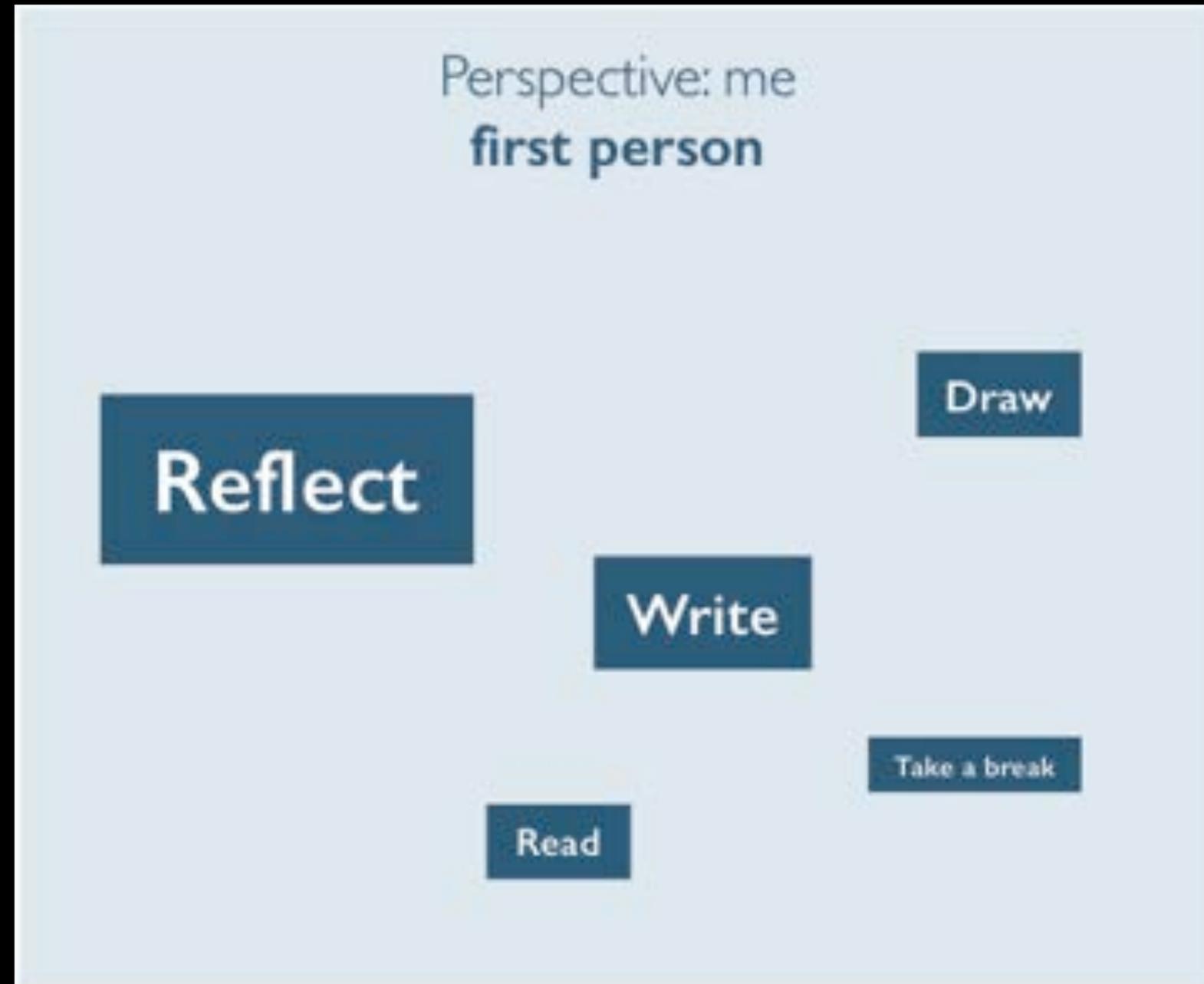
# Showing relations



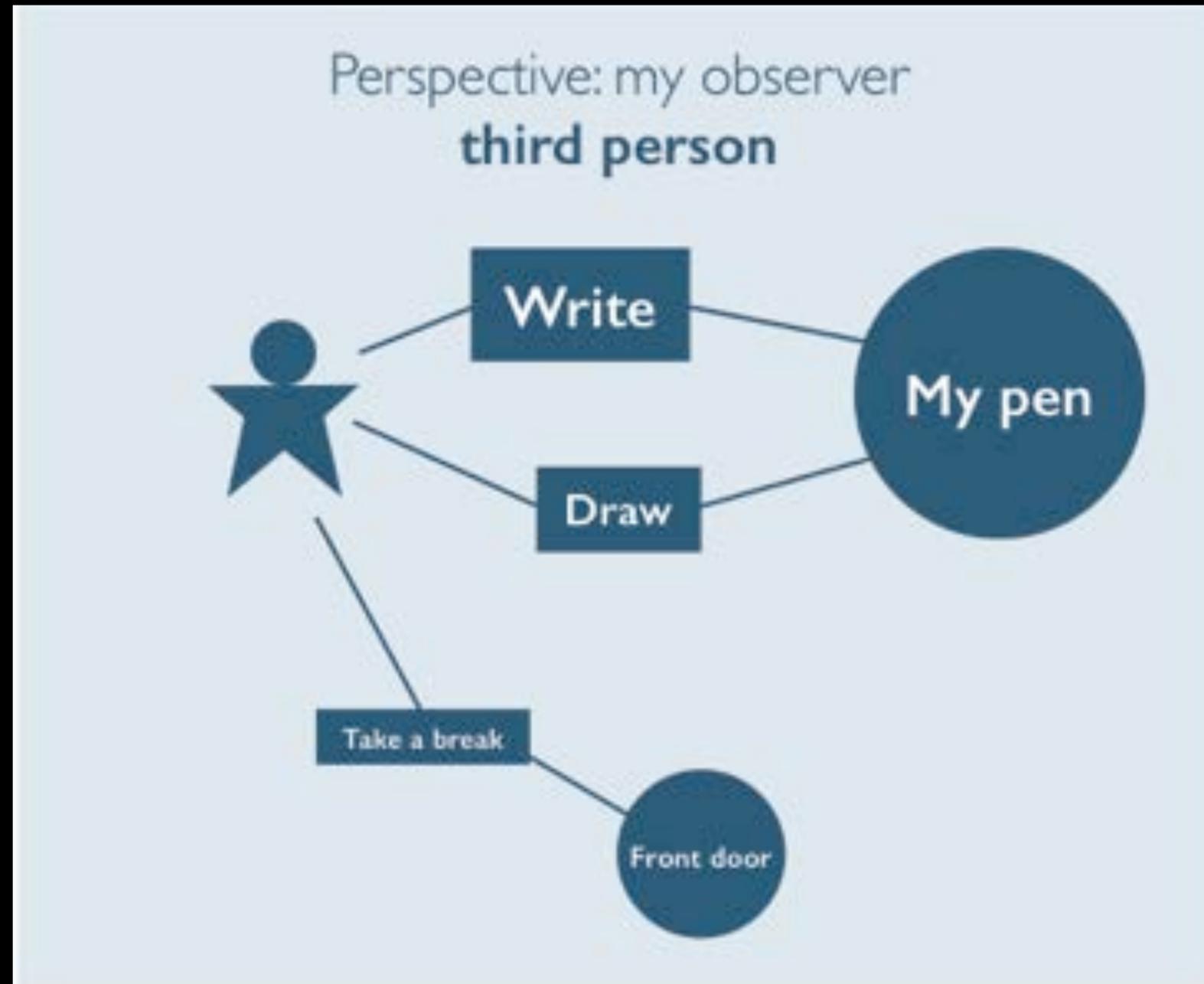
# Taking a god's eye view?



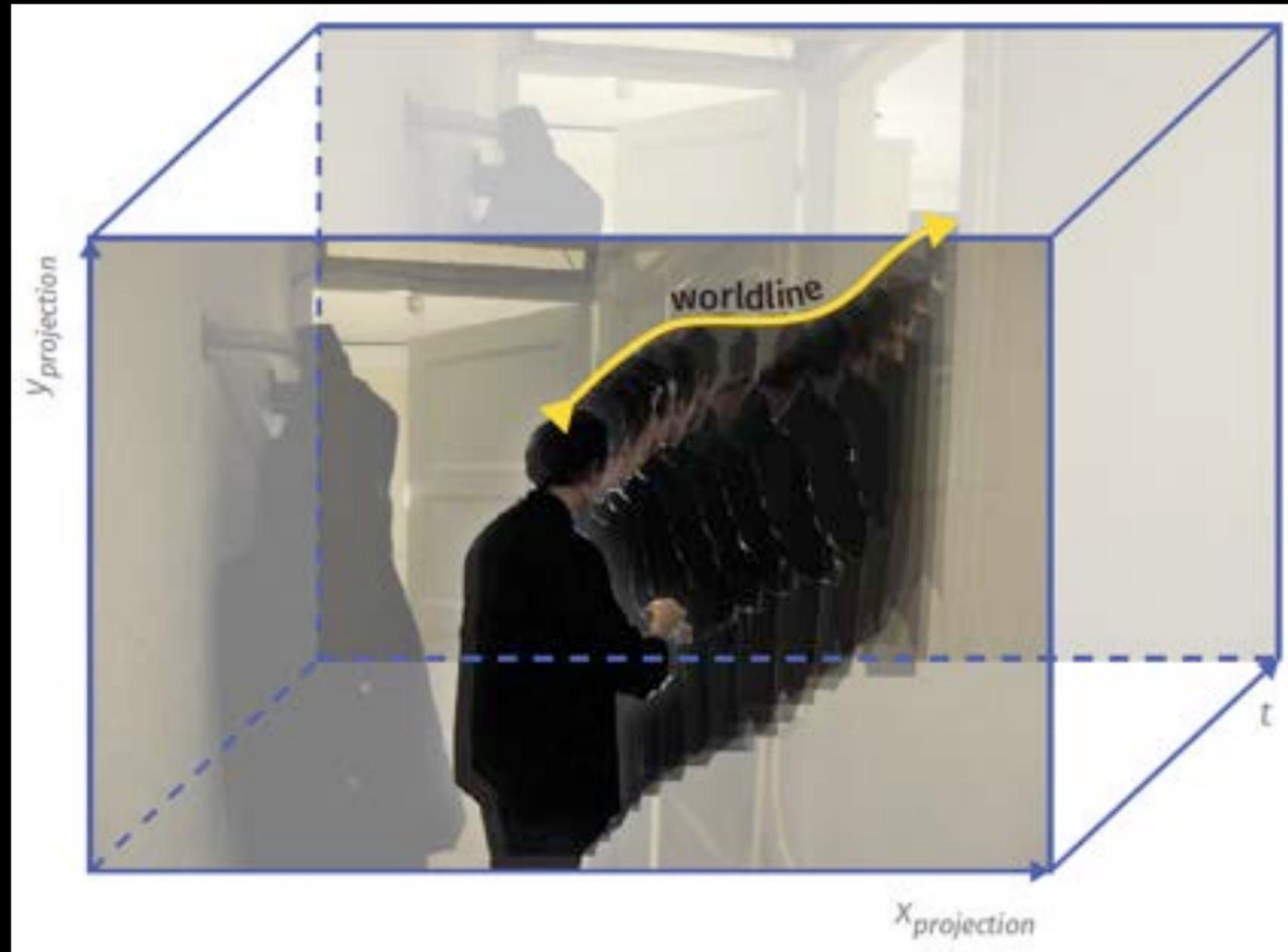
# Perspectives on subjective experience



# Perspectives on subjective experience



# Visualising dynamics



# Ontology for interaction



# Conclusions

- Interaction design needs better visualisation techniques.
- The *Visualisation of Affordances* is an early example.

# Next steps

- Can this actually be used for design?
- How to deal with more complexity?
- Can we link it more closely to product and human body properties?
- How to measure the data?
- How to standardise the sketches?

