

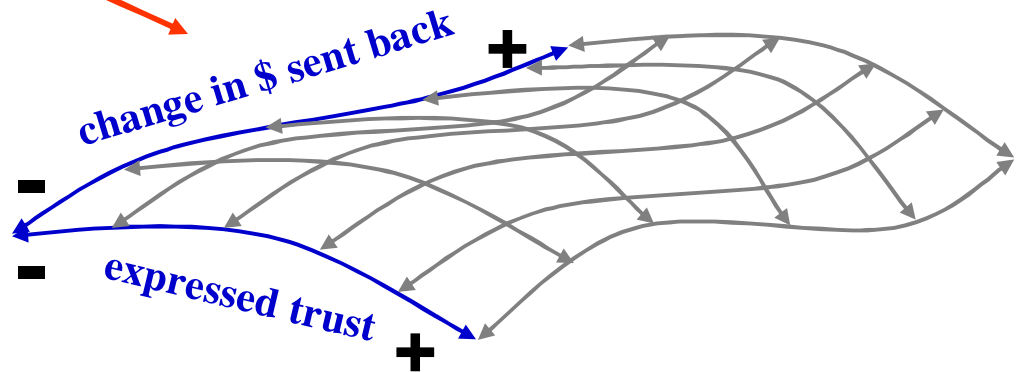
The mapping problem:  
from biological interactions to computational function

**Physical measurement**  
*(many tools here)*

**Behavioral or perceptual  
measurement (model)**

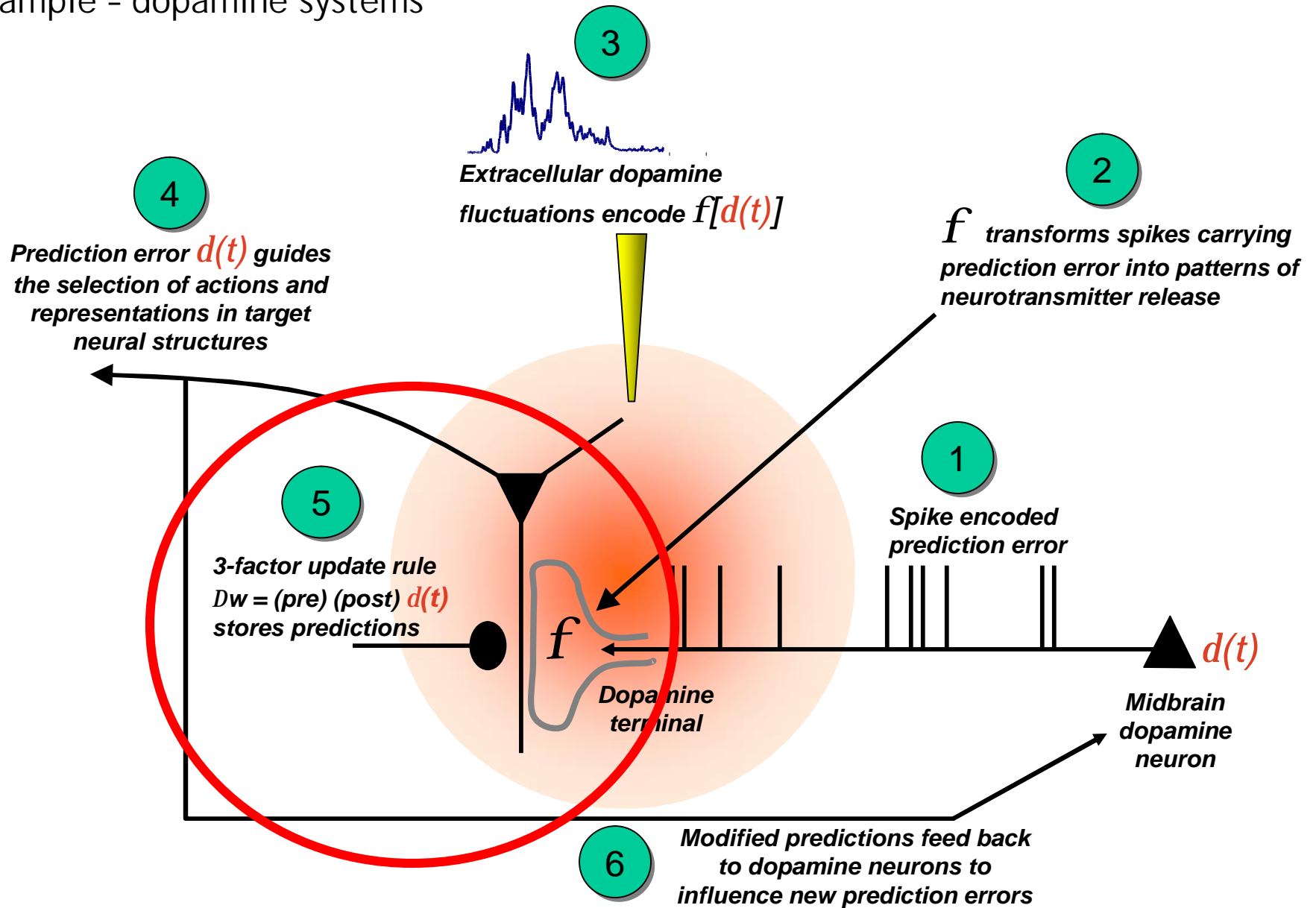


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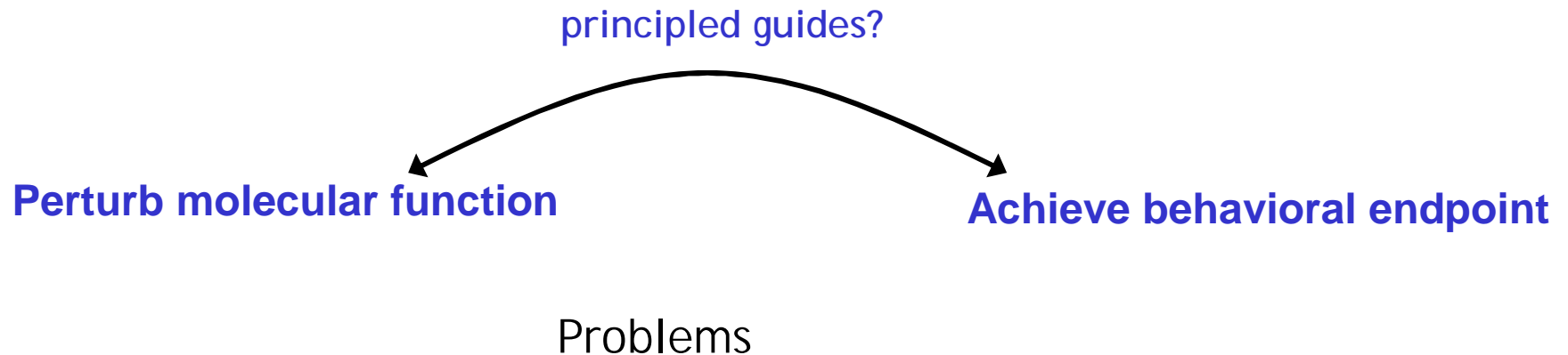


**Current work is moving away from psychological categories to  
hypothesized computational functions**

# Example - dopamine systems

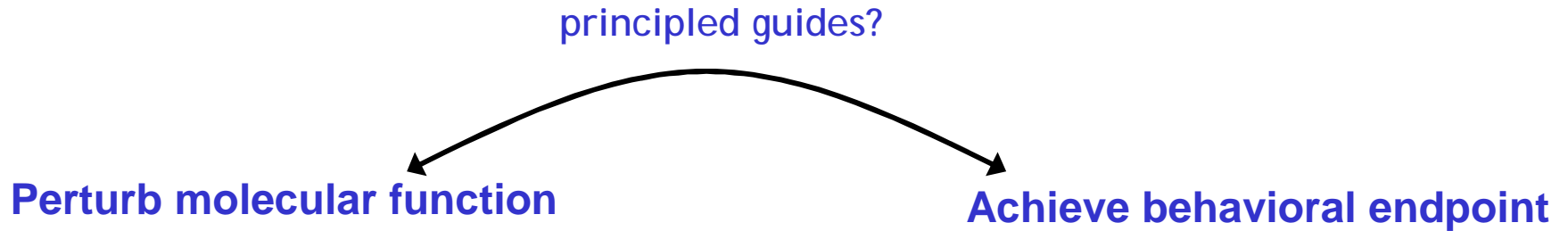


## Characterizing and 'fixing' mental function



- Receptor systems play different roles in different biological contexts
- Large placebo effect - we are in large part engineering mental states that influence disease progression, healing, and so on...
- Behavioral endpoints have not generally been depicted as computational problems.
- Brain disorders are not 1-1 with mental disorders... not clear what to fix

# Future needs



- Let the data speak for itself, there are tons of it now... think 'the Google'
- Machine learning methods can provide '**normative**' descriptions or simply identify important variables (**without a psychological model**)
- Requires different kinds of training for physicians and scientists – need to find ways to remove 'hard' **paradigm boundaries**
- For example, recent work has employed mathematically prescribed **economic games** to patient populations (autism, personality disorders, etc)