


Mental imagery

PSY 200
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Lecture 24


Is a picture in your head like a picture in the world?

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Mental representation


- How do you mentally represent knowledge?
 - ♦ concepts (prototypes, exemplars)
 - ♦ propositions
 - ♦ mental images, maps

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Perception


- We have knowledge about, and memories of, perceived stimuli
 - ♦ sights
 - ♦ smells
 - ♦ touches
 - ♦ sounds
- Are these converted into propositions, or concepts
 - ♦ or is there something else?


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Images

- When we see this image how do we represent the information in the image?
 - ♦ analog: copy of image in head and we can retrieve it
 - ♦ symbology: convert to propositions/concepts

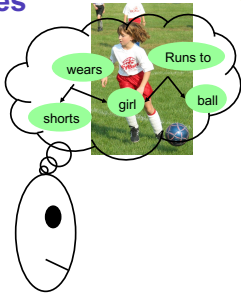



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Images

- I can remember the image on the previous slide and it *feels* like I picture the image in my head
 - ♦ but is it really?
 - ♦ could it be a proposition?

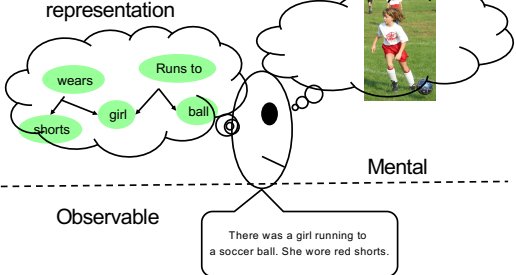



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Images

- If you ask me questions about the previous slide, my answers would not necessarily identify the representation




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Pure propositions


- Let's look at the arguments for a purely propositional representation
- Look at this picture, I'll ask you questions about it

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Working with images

- If this image was printed on a piece of paper, you would have no problem answering the questions about it
- If you had an exact copy of the image in your head, you would expect you could "look" at the copy and make all kinds of judgments
 - but you cannot
 - how you interpret the image to a large extent determines what you know about it
- Mental images are not exactly like real images
 - this tends to be particularly true for *memory* of images
 - verbal descriptions dominate memory for images

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Another example

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Another example

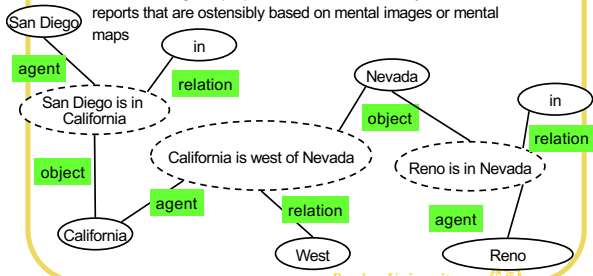
- How did you do?


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Propositions

- So this suggests that mental images are not exactly like real images
 - and something like propositional information likely influences reports that are ostensibly based on mental images or mental maps




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Propositions

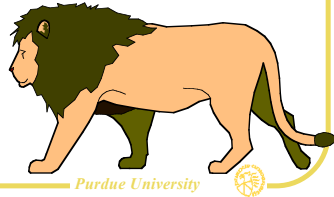
- It is clear that propositional information influences mental imagery
 - but is it *all* propositions?
 - are there mental images, as we tend to experience them?
- Is there any reason to believe that mental images are at all analogous to real images?
 - yes

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Representation of mental images

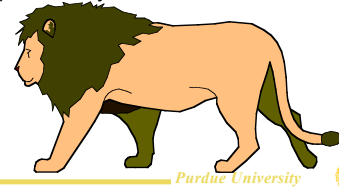
- Imagine you have a mental image of a lion
 - If the mental image is a *description* (set of propositions), then it should include descriptive information (head, mane, ears, whiskers,, tail,...)
 - size of body parts shouldn't matter much (except as information in the proposition)



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Representation of mental images

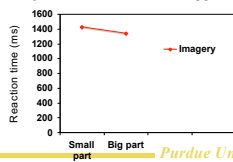
- Imagine you have a mental image of a lion
 - If the mental image is a *depiction*, then it should include factors such as head, mane, ears, and their sizes and relative positions
 - self reports of mental images suggest the depicted version, but how to measure experimentally?



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Representation of mental images

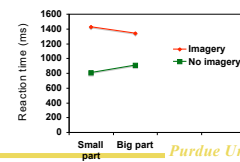
- Kosslyn (1976)
 - Ask subjects to quickly answer questions like:
 - Does a lion have a head? (big body part)
 - Does a lion have claws? (small body part)
 - subjects in two groups
 - 1) form a mental image of a lion
 - 2) think about a lion, but without a mental image
 - Subjects forming a mental image respond more quickly to the head question than the claw question
 - presumably because the head is *bigger* in the mental image



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Representation of mental images

- Subjects that did not form a mental image respond more quickly to the claws question than the head question
 - presumably because the propositions about a lion having claws are more accessible in some network of propositions
- So, different ways of thinking about a lion can lead to different patterns of access to information
 - which implies mental images are different than propositions

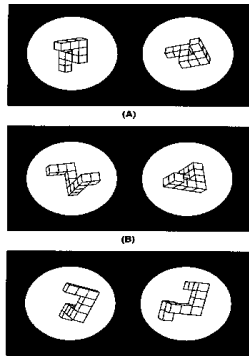


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Mental rotation

- Shepard & Metzler (1971)

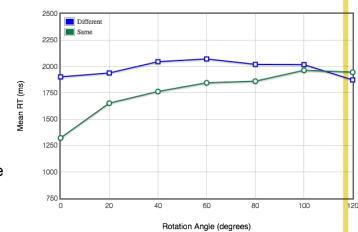
- 3-D shapes
- rotated in plane
- or in depth
- decide if shapes are same or different
- measure time to decide



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Mental rotation

- CogLab experiment
 - 148 participants
 - The more rotated the stimuli are, the longer it takes to make a response
 - close to linear increase in RT



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Mental rotation

- This type of experiment has been taken as strong evidence that mental images are *not* just propositions
 - ♦ imagined movement of the mental image (rotation) resembles actual movement
 - ♦ It takes time to mentally move through a mental space
 - » The CogLab data suggests it is about 217 degrees/second
 - » 4.6 milliseconds for each degree
 - ♦ no reason why propositions would give data that incorporate spatial and temporal relations between aspects of the mental images

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Vividness

- There are individual differences in reports of mental image vividness
 - ♦ some people report their mental images are just like real images
 - ♦ others report they are fuzzy and vague
 - ♦ some people report no mental images at all (10%)
 - ♦ Nevertheless, people all do basically the same on many tasks that seem to require operating on mental images

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Conclusions

- Mental representations of pictorial information
- There are some things you cannot do with mental images
- Propositions are important
- Mental images are not just propositions
- Mental rotation task

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Next time

- Review for exam 3
- After Exam 3
 - ♦ Start a discussion of language
 - ♦ Language as an instinct
 - ♦ pidgins and creoles
- *Why we do not have to worry about teaching language in school.*

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