Questions from the slides on Modeling and imagery:

1. Where might information for learning movement skill come from?
   
   Spoken words, written words, watching others, your own movements, sounds of other people moving, other people moving your body parts...any others?

2. What does the Wilson and Knoblich paper tell us about modeling and how it might affect learning?
   
   Rather a lot. But the most concise thing I can say about this is that there is a good chance that modeling elicits more than just a sensory response in us. Rather it seems to trigger a motor response as well, and might even trigger sequences of copied movements run by an “emulator” in the motor centers of our brains (this is a bit of a stretch for now, as the evidence only suggests detailed responses in those who are already accomplished at the tasks they observe...but there is evidence gathering that beginners get this activation too, though it may not be as sophisticated). It does also suggest that there is a lot more neural activity triggered by modeling than that which is reflected by our conscious thoughts (point light display research also shows this), and it explains why we find modeling by others who are physically similar to us the most useful. Finally, it suggests at least one separation between modeling effects and effects of simple verbal instructions – verbal instructions would not be expected to result in such motor activation (unless it was started by imagery).

3. What can be said of the information picked up from a demonstration, relative to other ways of relating such information for learning, and what are emphasized as reasons for demos being better than other modes of transmitting information? (do you remember the example used in the slides – slide #5?)
   
   There is far more information communicated via a demonstration than could be expressed either in words or a series of static pictures. One of the reasons for this is likely to be that we have specialized abilities to pick up relative motion information from watching someone move. This is likely to be picked up subconsciously, as is hinted at with the point light display research. (The example referred to was trying to describe walking to an alien with a configuration of limbs entirely dissimilar to ours).

4. What is point light display (PLD) research? What does it tell us about observational learning? Does it tell us that we are activating motor centers in our brain when we watch someone else move?
   
   PLD research involves placing reflective markers on a person (say, Anna) dressed in dark clothing, such that a camera only picks up the movement of the reflective markers (the rest of the person’s body is not visible). An observer looking at a video of Anna’s movements (or rather, those of the markers attached to Anna) will instantaneously recognize the movement, together with some subtle peculiarities of it (such as whether Anna is carrying a heavy or a light box). This recognition is quick and effortless. Asked how they knew Anna was carrying (say) a heavy box, the observer will typically not be able to say exactly what it was about the display that enabled them to make this correct judgment. Hence this research suggests that, after watching a demonstration, we might have interpreted more information than our conscious minds is capable of reporting. Of course, it is still true that the movements watched are largely already known to the observer...and this might aid the unconscious pickup of information. It certainly doesn’t do what the last question suggests, though – that suggestion comes from elsewhere (for example, a series of fMRI studies cited in the Wilson and Knoblich paper).

5. What prevents information provided by a demonstration from instantaneously improving motor performance?
The need to apply the information from the demonstration to one’s own movement system. This involves at least two steps, as far as I can see. One is to adapt the information from the kinematics and kinetics of the observed person’s body to one’s own (giving rise to the tendency for observations from someone physically similar to oneself being the most useful), and the other is the need for calibration of the movement to one’s own movement system, which may be a matter both of physical similarity and of our own previous experience. See below for more on calibration.

6. There is a longish conversation on the nature of learning with demos between slides 10 and 12 in set 1. Overall, what can be gleaned from the evidence presented about the effect of demonstrations on learning simple and complex skills?

All skills require practice before the beneficial effects of the demonstration are expressed in the person’s improved performance. For simple (or well learned) skills, these improvements are likely to occur relatively quickly, while for complex (or novel) skills, the process is a far longer one. This is because, even with simple skills, there is a small degree of “getting used” to the movement, in terms of its precise control (how stiff is that button you are trying to push, how hard is the ball you’re trying to control with your foot?). With complex skills, it’s not just a matter of adjustment, but of actually getting your limbs to adopt the unknown phase relationships amounting to a new coordination pattern. As we know from the dynamic pattern theory stuff, the more dissimilar this is to your own intrinsic dynamics, the longer this will take.

7. Does movement learning require declarative knowledge to be acquired prior to procedural knowledge?

No. The dual coding or action-language-imagination model from John Annett (1996) exploits this fact, and the various experiments conducted on patient H. M. and others like him support it. But we don’t have to go that far...we all learn movement skills without accompanying declarative knowledge when we are very young children (i.e. before we have learned language, before we can “declare”).

Answers for Second Set:

1. How does Patient H.M. help us understand the special way in which motor skills are remembered, in contrast with, for instance, verbal skills?

The surgery he underwent bilaterally removed the hippocampus, amygdala, and a portion of the medial temporal lobes. This effectively removed his ability to form new declarative memories. However, in a series of tests, he has been shown to still be able to learn motor skills. As such, it is clear that the neural pathways needed to learn movements are distinct from those needed to learn cognitive skills.

2. Define implicit and explicit learning.


3. What are the “perceptual processes” at the top of the ALI model?

On the right (verbal instructions) side, we have conscious thought (internal verbalizations, reasoning), while on the left we have all manner of motor processes, most of which are beyond consciousness. It is imagery that lies somewhere between the
two, and is undoubtedly involved in the left hand side at some point. Hence, imagery is the link between the right and left sides of the model.

4. Contrast the model given in the first set of slides (modeling) with the ALI model given in the second set of slides (imagery). How are they different?

It’s the same from top to bottom, but another “stream” has been added to signify the potential separation of motor and verbal sources of information.

5. How might the use of verbal instructions differ from using demonstrations, according to (and in terms of) the ALI model?

Less direct. Verbal instructions have to access the movement centers after first passing through the verbal centers. Given that the ultimate method of “awaking” the motor centers (those that move us) is via motor imagery, it would seem to make sense to use an approach to instruction that most closely ties to this destination, while providing the information necessary to learn the skill. So, an instructor might first consider purely visual or proprioceptive (feel) cues, because they descend directly through the left side of the ALI model and thus directly stimulate motor imagery. If the information can’t be provided that way, then go with words, but remember that the ultimate destination is to motor imagery, so one should use words that are more likely to stimulate this.