LSU PHIL 4941 / Spring 2016 / John Protevi

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Jason Stanley and John Krakauer, "Motor skill depends on knowledge of facts," *Frontiers in Human Neuroscience* 7 (Article 503), 29 August 2013. doi: 10.3389/fnhum.2013.00503

ABSTRACT:
Overall, the authors affirm that skill requires both acuity and knowledge. Via philosophical analysis, and via analysis of HM case, the authors undermine folk distinction between practical and theoretical activity. Paper emphasizes that despite common belief, cognitive neuroscience findings do not support that distinction.

- Acuity = increased precision in selected actions; this need not require propositional knowledge (thus there is a parallel between motor acuity and perceptual acuity); however, this is only part of skill.
- Knowledge ("knowledge-based selection of the right actions") required for manifesting a motor skill.

OUTLINE
Introduction
Motor skill, perceptual discrimination and intention
Propositional vs declarative knowledge
The lessons of HM: motor acuity, action selection and knowledge
Conclusions

INTRODUCTION

1) Initial dialectic:
    a. Platonic skill: explain principles guiding action; otherwise it is just a habit.
    b. Against this extreme position, many now think skill does not involve knowledge of rules.
2) Definitions:
    a. "Implicit" = learning w/o intention or awareness, even if initiating, continuing, and practicing an action is intentional
    b. "Knowledge" =
        i. State w/ propositional content, suitable for guiding action
        ii. Verbal articulation of that content is not necessary for knowledge
3) 20th century thinkers
    a. Ryle: skill is manifestation of non-propositional state of know-how
    b. Merleau-Ponty: denies skilled behavior manifests cognitive states
    c. Bourdieu: habitus is non-cognitive
    d. Dreyfus: skilled coping is not rule-following; skill is discrimination of special cases
4) Cognitive neuroscience
    a. Seems to mirror these phil assumptions
        i. Active reflection on principles impedes performance
        ii. Retention of knowledge of facts not needed for skill (HM case)
    b. Assumptions
        i. Equates procedural knowledge with motor skill
        ii. Opposes procedural knowledge to declarative knowledge (= verbal articulation)
        iii. Declarative knowledge
            1. Is verbally articulable
            2. Is folk sense of knowledge of facts
            3. As well as philosophical sense of kn (kn of propositions?)
    c. Overall tendency:
        i. To minimize cog aspects of motor skill
        ii. At best cognition modulates motor skill; at worst it contaminates it
5) Thesis
    a. Practical vs. theoretical divide
        i. In part based on misunderstanding science
        ii. Hasty / wrong identification of neuroscience categories and mental kinds

1. Procedural "knowledge" (a misnomer) = motor skill
2. Declarative knowledge = traditional sense of kn (verbal articulation)

b. Authors position
   i. They do not hold Platonist view that kn requires explicit kn of first principles
   ii. But they reject independence of skill and knowledge
   iii. So that skilled action
      1. Is guided by kn of facts about an activity
      2. Even though skill is not exhausted by knowledge
         a. That is, some aspects of skill are not knowledge-based
         b. But some are – this is a modified or modest intellectualism as opposed to Plato's radical or extreme intellectualism
   iv. Problem:
      1. "Procedural knowledge" has been applied to non-kn aspects of skill
      2. But it doesn't follow that skills do not require kn of facts
      3. Thus we have made an attribute of a component of skill (that it is non-kn based) into an attribute of the whole of skill
   v. Note that intellectual ability may involve implicit (non-intentional) abilities

6) Forecast
   a. Pre-theoretic notion of skill
      i. Requires guidance by kn of facts abt activity; e.g., kn of what to do to initiate that action
      ii. But fact that some agents can't verbally articulate content of that guiding knowledge does not undermine status of knowledge here
         1. Not just in declarative knowledge
         2. But in any sense of knowledge
   b. HM case
      i. HM cannot acquire motor skills
      ii. Mistake to equate procedural knowledge with skills
   c. Cog neuroscience provides no basis to distinguish theoretical and practical activities
   d. Reflection on that suggests there is no such distinction

MOTOR SKILL, PERCEPTUAL DISCRIMINATION AND INTENTION

1) Two necessary conditions for belonging to functional category of "skill"
   a. Practice-related improvement in goal-directed action (p. 3)
   b. [Knowing what to do to initiate action manifesting the skill (begins on p. 4)]
2) Compare / contrast skills with perceptual abilities (misnomer to call them "perceptual skills")
   a. Basic ability of PA does not require instruction
      i. But basic ability in skilled action does require instruction or observation, as does improvement
      ii. Hence skills improvement needs learning of facts
   b. Skilled actions are under rational control
      i. Possession of skill allows voluntary error (Aristotle discussion)
      ii. Manifestation of skilled action is intentional: you can ask agent why they did it
      iii. E.g., archer decides to pick up bow to manifest skill at archery
   c. Conversely, non-intentional movements are not manifestations of skill
   d. Manifestations of perceptual ability are not intentional action; rather, they are belief states,
      i. Which are not under direct voluntary control
      ii. Even if they are under indirect voluntary control (join different community)
   e. Perceptual abilities are not skills
3) To have a skill one must know what to do to initiate the action that displays the skill; this is prop kn
   a. Know-how has been claimed to be non-prop kn
   b. But know-how is like know-when and other know-wh states; these are all prop kn
      i. Embedded infinitival questions
      ii. Entail deontic modality: know what you ought to do to manifest the skill
      iii. This knowledge can be variable by context
   c. Initiating an action
      i. Is not beginning a causal chain

        ii. Rather, it is knowing what to do to begin an intentional action
    d. So, **part** of having the skill is knowing what to do to initiate action that manifests the skill
        i. This explains Aristotle's claim that skills are voluntary
        ii. Skill possession requires knowledge that entails voluntary control
        iii. And hence explains capacity for voluntary error
    e. What is nature of modality of knowledge that allows voluntary control?
        i. Will rest on knowledge of basic actions (picking something up)
        ii. That are not skills but are nonetheless under our voluntary control
4) Authors do NOT say skills ONLY require know-what to do to initiate actions
    a. But knowledge like that of initiating an action can be injected into course of activity
    b. So they are claiming that skills require SOME knowledge
5) Back to perceptual ability
    a. Not clear someone w/ perceptual ability knows what to do to initiate action displaying the ability
    b. Implausible to think perceptual discrimination is an action at all
    c. So improvement here is not acquisition and improvement of a skill
    d. What about something like wine tasting?
        i. Needs active decisions and deciding what factors count; voluntary errors are possible
        ii. So wine tasting is a skill for JS and JK
6) Transition: not all skilled agents can verbally articulate knowledge of what to do to initiate an action.

PROPOSITIONAL vs DECLARATIVE KNOWLEDGE

1) Possession of know-what to do to initiate action displaying skill
    a. Does NOT entail ability to explain that knowledge
    b. IOW, propositional knowledge (know-what to do…) does not require verbal articulation
2) Cog neuroscience category of "declarative knowledge"
    a. Does require ability to verbally articulate
    b. Is thought to be identical with propositional knowledge
3) Stanley 2011 denies that propositional knowledge needs verbal articulation
    a. It's unclear what "articulable" means
        i. If one excludes "this / that" from articulation then not all prop kn can be articulated
        ii. If one includes them, then stock examples of non-articulable prop kn are articulable
    b. So it's unclear what notion of articulable underlies declarative knowledge
4) Human language lets us access some concepts non-linguistic creatures can't access
    a. But concept possession in general does NOT require linguistic articulation of content of concept
    b. Some non-linguistic animals have same concepts as we do
    c. So propositional attitudes don't depend on capacity for verbal articulation
5) Why have so many philosophers / scientists thought kn of facts requires verbal articulation?
    a. SOME knowledge examples are characteristically shown by verbalizing
    b. But that needn't be generalized to all knowledge
    c. In general, propositional knowledge guides action; verbal assertion is only a case of showing knowledge
6) Conclusion:
    a. Propositional knowledge of what to do to start a skilled action need not be articulable
    b. Declarative knowledge, which does require verbal articulation
        i. May not be a well-defined notion
        ii. But in any case it is not identical to propositional knowledge w/r/t skills

THE LESSONS OF HM: MOTOR ACUITY, ACTION SELECTION AND KNOWLEDGE

1) HM case shows multiple memory systems in brain. This is very important, but has been harmful.
    a. Allowed false mapping of true cog NS distinction of declarative vs procedural "knowledge"
    b. Onto bad folk distinctions
        i. Knowledge vs skill
        ii. Theory vs practice

2) HM cases show dissociation btw improved motor performance and ability to recall task aspects
    a. However, HM required explicit instruction each day
    b. So the idea that HM had an entirely procedural motor skill is undermined
        i. If you really have a skill, you don't need instruction to start over every day
        ii. What is being learned each day is not skill but only a part of skill, *motor acuity*
            1. Practice-related improvements in reducing variability
            2. And increasing smoothness of movement
    c. Compare with ordinary skill
        i. Requires propositional knowledge
        ii. Normal subjects will experiment with new uses of tools (gain new prop knowledge)
        iii. This new prop kn will combine with motor acuity to improve performance
3) Again, motor skill involves both prop knowledge AND non-knowledge acuity / procedural aspect (procedural "knowledge" is misnomer)
4) You might still try to ground practical vs theoretical in cog neuroscience by saying that displaying ("theoretical") knowledge does not have a procedural component
    a. But the display of knowledge requires some non-knowledge / procedural components
    b. Displaying perceptual knowledge by asserting color of desk requires non-knowledge perceptual acuity
    c. Chess and math require unconscious processing
5) Thus, displaying both propositional knowledge and motor skill involves both propositional knowledge and perceptual / motor acuity, so there is no good distinction between theoretical and practical activity
6) BASIC POINTS on relation of knowledge and skill: KNOWLEDGE IS SCAFFOLD
    a. For development of acuity of selected action components
    b. For development of new actions (e.g., new techniques of running, jumping, etc)
    c. For development of ability to select the right action from a repertoire
7) Can non-human animals be skilled? Authors are agnostic here.
8) Summary of philosophical positions on motor skills
    a. Pavese: skills are knowledge states
    b. Railton: skills are belief states
    c. Stanley 2011: skills are guided by knowledge
        i. Having a skill is state yielding fluid acquisition of reasons for acting in novel situations
        ii. (JS and JK position): Skills are composite states w/ both
            1. Increasing knowledge of required actions (knowing what to do to initiate …)
            2. Practice-related improvement in acuity and selection of actions

CONCLUSIONS

1) Dreyfus:
    a. Skill moves you from guidance by knowledge-based decisions to perception of right action
    b. Expert performance is a species of perceptual acuity
        i. But this assimilates skill to HM's performance
        ii. But HM needed repeated instruction;
        iii. So HM wasn't skilled: he couldn't adapt to new tools bcs he couldn't retain knowledge
    c. Expertise is automatic or habitual and knowledge drops away
        i. Not really; expert uses knowledge of activity to dictate to non-knowledge components
        ii. It is combination of knowledge and acuity that leads to skilled performance
        iii. Even if initial scaffolding for basic components drops away that doesn't mean you don't need new knowledge
            1. To continue refinement of skill
            2. To add new non-knowledge components
2) Because of wide acceptance of division btw expertise and knowledge we have lost sight of a major philosophical tradition going back to Plato and Aristotle
3) This paper has shown that cog neuroscience abt motor skills does not support claim that motor skill activity is not manifestation of knowledge.