

Commentary on Sterelny and Hiscock, *Cumulative Culture, Archaeology, and the Zone of Latent Solutions*

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Late Pleistocene Skill Domains

Sterelny and Hiscock (S&H) argue against the centrality of high-fidelity copying in cumulative culture. I address one key strand of their case, the decoupling of expertise from precise imitation. This advances understanding of hominin skill acquisition, and underlines a puzzle about domain-specificity.

S&H acknowledge that certain tasks require forms of imitation learning for acquisition and transmission. But, they argue, following procedures or 'recipes' of (for example) chunked motor techniques is a different phenomenon from the development or performance of an expert capacity. Genuine skills are shown, rather, in the capacity for on-the-fly adjustment to changing circumstances, in the construction or transformation of experienced patterns rather than the proceduralized replication of grooved technical sequences. Pre-loaded recipes are insufficient not just because practitioners don't have inbuilt recording equipment to copy models (S&H, pp.26-27), not just because raw materials are often 'heterogeneous and unpredictable' (p.33), but also because of the 'domain size argument' (Christensen et al 2019). In complex ecologies, many skill domains have exponentially expanding potential contingencies. Experts often confront problems they haven't previously experienced, or challenging conditions in new combinations. Since automatic processes develop slowly, with limited flexibility, experts in these larger, variable performance domains flexibly deploy active, richer knowledge bases and higher-level cognitive control in action execution.

Expert performance is thus in a sense the opposite of copying. It is the context-sensitive production of novelty, drawing on sedimented experience, relevant knowledge, and attuned responses to materials and circumstances. In Bartlett's equation of remembering with playing a stroke 'in a quick game, such as tennis or cricket', we produce or 'manufacture' our backhands, our cover drives, and our memories alike out of the living and changing bodily, cognitive, affective, and environmental resources and conditions of the moment: though I *think* that I merely repeat a previous shot or 'reproduce exactly some isolated event which I want to remember', 'demonstrably I do not' (Bartlett 1932, 201-2). Existing templates or experiences *inform* current skilled performance, but there is no authorized version, no canonical standard. Unlike proceduralized habits, expert skills do not level off to 'an asymptote of perfection' (Ingold 2018, 161), but encourage constant reinvention as ecologies and circumstances change.

One puzzle in this picture of expertise concerns domain-specificity. On the one hand, bodily experience in manipulating particular materials or interpreting specific environmental processes seems essential. Whatever rich interactions between declarative and procedural cognition emerge in apprenticeship, these accounts of skill highlight the integrated bodies of *knowledge*, accessed and applied fast and flexibly in real time, that are treated as disruptive of embodied skills on alternative, 'mindless' skill theories (Beilock & Carr 2001; Dreyfus 2007). S&H's natural history compendia for forager ethnobotanists (p.36) exemplify such knowledge bases. Their compilation and deployment are socially shared, and they can be navigated, applied, and updated by skilled users smoothly and flexibly. Yet they remain decidedly domain-specific, perhaps with nested hierarchies of subdomains: in relation to cumulative culture, this line of thought suggests that expertise became more

entrenched with increased specialization, as group size encouraged further division of labour and distributed expertise.

But on the other hand, another original aspect of S&H's account implies pressures toward domain-*generality* in expert skills. They suggest that fuller skill repertoires brought emergent benefits: 'the general expansion of competence powered by social learning has various positive feedback effects' (p.37). S&H discuss some 'modular' technologies here, but suggest that some domain-specific skills developed in building composite tools later produce 'a general ability' transportable to other domains, available for recombination, thus opening up 'many more possibilities for innovation' across distinct fields and tasks. This combination of circumstances too likely arises in the Later Pleistocene.

I put two questions to S&H. Does their view of expertise in hominin history highlight domain-specific or domain-general skill acquisition? And what is the direction of change across these periods: towards more domain-specific expertise as skills specialize, or towards more domain-general expertise as holistic 'culture-dependent portfolios of information and skill' emerge (p.38)?

Distinguishing different skill types and levels drives pluralist responses. Among basic motor or technical skills, some are specific to materials and processes, such as the fine-grained kinematics and percussive movements of flake detachment in stone knapping tasks (Pargeter et al 2020). Others are transportable, like S&H's example of methods for making cord generalizing to new task domains, or when basic functional movement skills are components of other performance practices. Likewise at higher levels of action control, some aspects of expertise, as noted, rely on domain-specific declarative knowledge, or forms of situation awareness honed to the unique cues of one body of environmental phenomena. But other skills or meta-skills are transportable: in S&H's treatment, these are refined capacities to attune or retune awareness, to focus quickly and effectively, to diagnose and repair trouble, to reflect on and improve performance, and to advise others (pp.31-35). No abstract principles reveal which pattern-recognition capacities generalize more easily, or when the education of attention can be deployed beyond familiar domains: the context-sensitivity of expertise may itself be context- and task-sensitive, varying, as S&H say, both within communities and across skills and cultures.

In an ethnographic study of the migrant construction workers in Qatar who built vast modernist edifices for the football World Cup, Natasha Iskander describes small teams 'who hang from the sky' on unprecedented, vertiginous scaffolding several stories high. They work smoothly together with no common language (2021, 115):

Each scaffolder handled one ton of material every day. ... In the heat and din of the construction site, the pipes, planks, joints, and spanners were all manipulated wordlessly. The men relied on hand gestures and manual signals, like a twist to the pipe to convey the soundness of their grip to those passing the material or a tug to signal the direction in which they were moving the material.

Socially guided learning in these teams constantly reinvents the requisite interpersonal and affective attunements between skilled bodies and recalcitrant materials (Iskander 2021, 129, 134). In some senses such expertise is very domain-specific: the skilled migrant communities create urgent new apprenticeship practices bottom-up when managers unpredictably shift or substitute workers. Yet in other ways these are transformations of whole agents, structurally changed as by the fuller, integrated packages of resources that S&H stress. Perhaps the distinction between domain-specific and domain-general skills itself needs reconsideration.

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