
Subjective selection needs socially transmitted goals and culturally evolving problems

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ABSTRACT

Our commentary aims to enrich Singh’s subjective selection framework in two fundamental ways. First, language is necessary for coordinating on shared instrumental goals. Without it, the explanatory burden rests largely on evolved psychology. Second, goals themselves are culturally constructed, socially transmitted and cumulatively evolving over time. This co-evolutionary dynamic between problems and solutions exceeds what fixed psychological hierarchies can explain.

Keywords. cultural evolution · subjective selection · instrumental goals · problem-solving

We applaud Singh’s (Singh, 2025) effort to reorient cultural evolutionary theory towards a richer, deeper psychology (Sperber, 1996), providing more agency to individual cognition while still retaining the specifically populational, evolutionary patterns and processes that shape human culture. Singh’s framework is grounded on two key features of human cognition: a psychologically determined hierarchy of goals and the psychology we deploy to evaluate which means to select to satisfy these goals. Higher-order goals are essentially fixed and universal. Subsumed under these are instrumental goals, the solutions to which are evaluated through preferences that are themselves reflections of these higher-order goals. This allows Singh to explain cultural near-universals in a finer-grained and more charitable way than processes of cultural group-selection or plain old natural selection. In the following commentary, we argue that explaining the emergence, evolution and convergence of complex cultural traditions requires (i) incorporating the role of language for coordinating on shared instrumental goals, and (ii) recognising that goals themselves can be culturally constructed, socially transmitted, and cumulatively modified over time.

To explain cross-cultural convergence in traditions, Singh’s account relies on groups pursuing shared instrumental goals and evaluating cultural variants in similar ways. However, even if

we grant that evolved psychology helps humans coordinate on higher-level goals, we still need to explain how groups coordinate on the specific instrumental formulations that afford the evolution of convergent cultural solutions. Language, as a communication system capable of conveying richly structured propositional content (Pinker and Bloom, 1990), is a uniquely powerful means by which humans can coordinate on these shared instrumental goals (Clark, 2020). Through language, groups can explicitly and implicitly share information about goals, collaboratively develop and evaluate solutions, and negotiate which instrumental goals warrant collective investment. Without language, or some additional mechanism(s) for coordination, the solution space is dauntingly vast, making it difficult to explain why populations repeatedly adopt and converge on similar cultural traditions like shamanism or sympathetic plot narratives. Indeed, the latter somewhat supports this dynamic: the narrative structure, featuring a goal-directed protagonist who confronts obstacles, overcomes them, and wins rewards, partly serves as a mechanism for culturally transmitting information about instrumental goals as well as schemas for how to structure goals, identify obstacles and conceive of solutions. In this respect, language acts as an amplifying factor for turning weakly biasing higher-level goals into strongly constraining instrumental ones through repeated episodes of social transmission and collective deliberation.

Not all goals we pursue, however, are best explained through a relatively fixed set of universal motivations and preferences. On the contrary, humans are extremely proficient at generating new, often imagined or self-imposed goals—which we prefer to call *constructed problems*—, with many solutions far removed from adaptive concerns of survival and reproduction. It is this combination of flexible problem construction and linguistic capabilities that offers a powerful framework for understanding goals as culturally evolving entities. We propose there are two key benefits of adopting such a framework. First, constructed problems shape the search space of possible and satisfactory solutions, and when constructed problems are transmitted across generations so too are their search spaces (Winters and Charbonneau, 2025). Importantly, this allows problems and solutions to enter into reciprocally causal relationships: solutions to constructed problems often result in the emergence of new problems, which, in turn, affords the discovery of novel solutions (Arthur, 2009; Winters, 2019; Charbonneau, Strachan and Winters, 2023; Charbonneau, 2025). Second, constructed problems rarely if ever emerge fully formed, in that early problematization or goal-setting is generally vague, what cognitive psychologists refer to as *ill-structured problems* (Simon, 1973). Constructed problems can increase in clarity and structure as individuals engage in problem solving, with tentative solutions helping refine the problem space one is engaged in exploring (Simon, 1995). We argue this process can be distributed over multiple generations and across groups, leading populations to cumulatively improve the structure of their problem traditions.

Consider, for instance, the challenge faced by Old Kingdom architects in Ancient Egypt. Egyptian pyramids may satisfy evolved psychological goals falling within Singh’s framework (e.g., being related to beliefs about the afterlife), but many of their aspects are best explained by the arbitrariness of wanting to build pyramidal monuments (e.g., why a building rather than an underground tomb, why pyramidal rather than rectangular, etc). Moreover, when documenting the long-term evolution of pyramids, we see clear instances where co-evolutionary dynamics are in play. After realising that mudbricks are unable to support the weight of these monuments, architects used this deeper appreciation of the underlying problem to switch solutions and opt for stone bricks instead (Romer, 2007). This subsequently led to a demand for a new class of stone workers, capable of cutting blocks with precise specifications, which, in turn, required new measuring and stonecutting techniques. Over successive generations, architects refined their understanding of pyramid building through trial-and-error (as illustrated by Seneferu’s many failed pyramids) and were able to formulate increasingly well-structured problems, culminating in the realisation that a lower-angled slope was necessary to avoid having the building crumble under its own weight (ibid).

The cultural evolution of Egyptian pyramids is indicative of what is arguably a more general and pervasive phenomenon in human history. When populations inherit both problems and solutions as co-evolving bundles, and when they cumulatively refine problem formulations over generations, cultural traditions exhibit open-ended dynamics that exceed what fixed psychological hierarchies can explain. These additional factors—the social transmission of constructed problems, their co-evolution with solutions, and their cumulative refinement—seem essential to capture the variety of problems we pursue and the nature of the solutions we select. Evolved cognition, with a fixed set of hierarchically structured goals, is limited in its ability to account for such dynamics.

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