Imagination

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Introduction

Imagination is a broad capability, underlying many different cognitive processes that are used in many different contexts. Researchers tend to focus on one of the various aspects or functions of imagination. Recently, research has been published on the spatial exploratory function of imagination. In their target article in Behavioral and Brain Sciences, Dubourg and Baumard (2022), by focusing on the exploratory function of imagination, endeavor to explain why we are captivated by fictions with imaginary worlds, and why we spend so many resources on these extensive worlds. Though the authors focus on the cultural evolution of fiction (specifically fictional worlds), their ideas, and the many commentaries they received, contribute to the overarching theories of the evolutionary functions of imagination as a cognitive capacity. I discuss their paper, highlight some of the commentaries that elucidate different possible adaptive functions of imagination, and cross-link to relevant commentaries throughout to create an overview of theories about the evolution of imagination in reference to fiction.

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Dubourg, Edgar, and Nicolas Baumard. 2022. "Why Imaginary Worlds? The Psychological Foundations and Cultural Evolution of Fictions with Imaginary Worlds." *Behavioral and Brain Sciences* 45:e276. doi:10.1017/S0140525X21000923.

Dubourg and Baumard conceive of the evolution of imagination as an adaptive (spatial) exploration through which new information can be accumulated and this knowledge can be maximized for future rewards (i.e., rewarding opportunities to find new resources). More specifically, the authors propose that imaginary worlds appear where and when exploration is the least costly (i.e., risky) and the most advantageous (i.e., adaptive). They predict that therefore, imaginary worlds will be engaged with and favored by: (i) young individuals, (ii) individuals with high openness to experience, and (iii) individuals in affluent environments. Not all predictions are supported by empirical evidence, however. The authors moreover suggest, in line with cultural evolution theories, that fictions constitute 'superstimuli' in that they are crafted to artificially grab the consumers' attention—they appeal because they have (culturally) evolved to suit our cognitive dispositions geared toward exploration. However, they also state that there is no "specific value in the information" that is included in the fiction (page 4); in this sense, imaginary worlds are like cheesecake for the exploratory mind, co-opted by cultural evolution for entertainment, and no adaptive function of the imagination of fictional worlds is assumed.

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Moore, Richard, and Thomas Hills. 2022. "The Evolution of Imagination and the Adaptive Value of Imaginary Worlds." *Behavioral and Brain Sciences* 45:e288. doi:10.1017/S0140525X2100217X.

Countering Duboug and Baumard, Moore and Hills argue that imagination is an adaptive capability. Its adaptive functions comprise thinking of alternate futures by anticipating and valuing potential actions and their consequences, and then choosing actions that would lead to the most preferred future. Thus, Moore and Hill conceive of imagination as the adaptive ability to engage in *self-projection*, the capacity to imagine oneself in an alternative future or past (i.e., counterfactual thinking) or in other people's shoes (Buckner and Carroll 2007). This ability to reason hypothetically and counterfactually is also highlighted by other

commentaries (Weisberg and Sobel 2022, Scalise Sugiyama 2022, Wilbanks et al. 2022). The main adaptive function that is put forward in this commentary and the related ones is that imagination allows us to simulate and 'test-drive' alternatives in a risk-free environment (Hogan 2022, Nissel and Woolley 2022, Wilbanks et al. 2022), and thus to learn or instruct about possible consequences of diverse courses of action (Scalise Sugiyama 2022, Sugiyama 2022) effectively and in a relatively short period of time (Wilbanks et al. 2022) without potential negative consequences actually happening in the physical world (Suddendorf and Corballis 2007). Moore and Hill point out that even when these imaginary worlds are fantastical, they still provide settings for common themes such as competition and conflict, romance, and so on (including exploration), an idea echoed by many other commentaries (Scrivner and Clasen 2021, Salmon and Burch 2022, Sugiyama 2022). Thus novelty in exploration through self-projection might simply be the novel arrangement of familiar elements (van Mulukom 2013, see also other commentaries, Oatley 2022, Llewellyn 2022, Shtulman 2022), in line with the constructive episodic simulation theory of self-projection (Schacter and Addis 2007). Another aspect of self-projection—autonoetic consciousness or the feeling of presence in the imagining—is explored in the commentary by Pianzola and colleagues (2022), who suggest that it is this embodied experience that best allows us to predict future situations and actions (see also Hogan 2022). As with other commentaries, narrative is considered "a training ground," but Pianzola and colleagues suggest that is used to practice predicting our exteroceptive and interoceptive signals in particular.

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Nyhout, Angela, and Ruth Lee. 2022. "Young Children Are Not Driven to Explore Imaginary Worlds." *Behavioral and Brain Sciences* 45, e291: 38-40. doi:10.1017/S0140525X2100234X.

Nyhout and Lee respond to Dubourg's and Baumard's target article by focusing on the developmental aspects of the research. Central to their argument is the proposal that "children's play, imagination and future thinking all tend towards the realistic rather than the fantastical" (39; see Harris 2021). They argue, on the basis of previous empirical research, that realistic fiction is preferred to fantastic fiction, as do other developmental commentaries (Beck and Harris 2022, Weisberg and Sobel 2022). Instead, Nyhout and Lee suggest, we should examine the complexity of the narrative stimulus, that is, the nature and degree of departure from the world. Norman and Goldstein (2022) similarly suggest that research

should focus on the ability to be in a distinct, quarantined cognitive space of fiction and pretend play ("fictional frame"), and what its limitations might be. Imagination in this sense is, as Dubourg and Baumard propose, a tool to explore. However, the developmental authors suggest that the adaptive benefits lie in the emotional and exploratory safety that imagination provides: The psychological distance of fiction allows for exploratory behavior, while its lessons can be carried forward into the "real" world. One engagement with fiction is *pretend play* which is considered a 'rough-and-tumble' simulation; one that reflects situations which the children encounter in their everyday life, depending on their cultural context (Norman and Goldstein 2022). Nyhout and Lee point out that if it is the function of children's exploration to acquire new skills and information, then it would be counterproductive if children engage considerably with imaginary worlds that are far removed from their personal "real" world (see also Weisberg and Sobel 2022). And indeed, despite their fictionality, imaginary worlds typically still map onto actual physical and social environments to a large extent (Scalise Sugiyama 2022, Scrivner and Clasen 2021).

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Gabriel, Shira, Melanie C. Green, Esha Naidu, and Elaine Paravati. 2022. "Using Imaginary Worlds for Real Social Benefits." *Behavioral and Brain Sciences* 45:e283. doi:10.1017/S0140525X21002181.

Gabriel and colleagues highlight that humans not only move in spatial, physical environments, but also in social environments—to the extent that early humans only stood a chance of surviving if they were accepted into collectives to protect and support them. The authors suggest that through immersion in the narrative world, "narrative collective assimilation" occurs, which is the experience of psychologically becoming part of the collective described in the narrative (Gabriel and Young 2011). This process, which creates a sense of shared identity, in turns contributes to group bonding and social cohesion (Goldy and Piff 2022, Wilbanks et al. 2022). Indeed, imagined social worlds, as master narratives or "imaginary realities," may be at the very foundation of cultures (Arnett 2022; Wylie, Alto, and Gantman 2022). Social bonding and cohesion are known adaptive outcomes (i.e., outcomes that contribute to survival and reproduction). Gabriel and colleagues conceive of imagination as the adaptive ability to become close with one's group, also fulfilling psychological needs such as the need to belong. A psychological process through which this may be achieved is to use imagination to work on one's attention to one's and others'

emotions, thus training one's empathy skills and emotional regulation (Rodríguez-Fuentes and Ulloa 2022). Gabriel and colleagues further emphasize that exploring an imaginary world is risk-free not just when it stands in for the physical world, but also the social world (Nissel and Woolley 2022): it similarly bypasses threats, pressures, and prejudices. Evolving to understand other humans is as important for survival as it is to explore unfamiliar locations (Winner 2022); thus, psychological exploration in an imaginary social world is an important adaptive function of imagination (Oatley 2022, Rodríguez-Fuentes and Ulloa 2022, Scrivner and Clasen 2021, Wylie, Alto, and Gantman 2022). A further implication of this argument is that the imaginary worlds are culturally specific: cultural adaptations such as imaginary worlds are influenced by physical, social, and cultural features and issues in specific environments (Wiessner 2022, Sugiyama 2022, Salmon and Burch 2022), something which is considered in particular by socioecological psychology (Buttrick and Oishi 2022).

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Goldy, Sean P, and Paul K Piff. 2022. "Imaginary Worlds Are Awesome: Awe Provides a Key to Understanding the Individual and Social Functions Of Imaginary Worlds." *Behavioral and Brain Sciences* 45:e284. doi:10.1017/S0140525X21002260.

Goldy and Piff discuss the novelty aspect of Dubourg and Baumard's argument for imagination as a device for exploration. In particular, they focus on awe, a powerful emotion which follows the perception of physical, social, or conceptual size, and is accompanied by the need for cognitive accommodation or updates to one's current mental schema (Keltner and Haidt 2003). By taking an awe perspective, the authors conceive of imagination as the ability through which curiosity can be piqued and important knowledge can be acquired, about the physical but also social world. The features of novelty that encourage learning are also pointed out in other commentaries, where authors similarly point out that the "sense of potentiality" provokes restructuring of one's internal model of the world (Gabora and Gomez 2022). A balance must be struck between novelty and familiarity, however: unusual ideas capture our attention, but not if they are too unusual or counterintuitive (Shtulman 2022, Sobchuk 2022). Familiar ideas are appealing because they are easy to understand, and because they provide predictable emotional experiences, which can be a source of comfort. However, if imaginary worlds are too familiar, then narrative transportation may become less likely because one's real life is still too salient (Gabriel et al. 2022). Indeed, Goldy and Piff

suggest that it is the focus away from the day-to-day concerns and stressors that helps with coping and leads to reduced stress.

Conclusions

Given its many functions, it is hard to capture what imagination does exactly and how these functions may or may not be adaptive. In their target article in *Behavioral and Brain Sciences*, Dubourg and Baumard have attempted to tackle this question from a spatial exploratory perspective. The commentaries have highlighted some issues with their theory and put forward additional perspectives which highlight connections to counterfactual and future thinking through self-projection (Moore and Hills 2022), developmental research and the importance of realistic imagination (Nyhout and Lee 2022), psychological exploration in social and cultural worlds (Gabriel et al. 2022), and the role of novelty and awe (Goldy and Piff 2022). Together, this *Behavioral and Brain Sciences* article comprises a highly interesting overview of some of the current perspectives on the evolution of imagination.

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