1. **The Name of the Author(s) of the target article:**
   Ivancovsky, Baror, & Bar

2. **Four Separate Word Counts**
   Abstract: 60
   Main Text: 1000
   References: 816
   Entire text (Total + Address): 1890

3. **An Indexable and Informative Commentary Title**
   Beyond novelty: Learnability in the interplay between creativity, curiosity and artistic endeavours

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10. **60-word Abstract**
    Using art and aesthetics as context, we explore the notion that curiosity and creativity emanate from novelty-seeking and outline support for the idea. However, we also highlight the importance of learning progress in exploration and advocate for a nuanced understanding that aligns novelty-seeking with learnability. This, we argue, offers a more comprehensive framework of how curiosity and creativity are related.

11. **1000-word Main Text**

Producing art is arguably one of the most ubiquitous and universally recognizable expressions of creativity. Similarly, curiosity is believed to play a central role in the aesthetic experience, driven by the novelty, ambiguity and uncertainty that is engendered by many artworks. The novelty-seeking model (NSM) proposed by

Ivanconvsky, Baror and Bar (2023) suggests that curiosity and creativity both result from the same mechanism of novelty-seeking, which is, in turn, influenced by one's state of mind. How effective is this model in accounting for the human motivation to produce and appreciate art?

We suggest that the model indeed offers considerable explanatory value in the context of art and aesthetics. For instance, many art forms span a spectrum that ranges from highly structured and representational to highly complex and unpredictable. The presence of the latter category, such as atonal music from the 20th-century Western art-music canon, clearly illustrates how humans sometimes prioritize an exploratory state of mind over an exploitatory one (Mencke et al., 2022).

Further, various art forms provide empirical support for the model's proposition of a shared neural basis for creativity and curiosity in the brain's dopaminergic areas (De Aquino et al., 2019; Omigie et al., 2019; Schuler et al., 2019; Tik et al., 2018). Dopamine medication has been shown to modulate creativity levels in individuals with Parkinson's disease when they engage in the production of visual artwork (Garcia-Ruiz et al., 2019; Lhommmee et al., 2014). Concerning curiosity and art appreciation, the modulation of tonic dopamine levels in healthy participants influences the degree to which they like and choose to engage with different styles of paintings and music (Cattaneo et al., 2014; Mas-Herrero et al., 2017).

However, we also have concerns regarding NSM's ability to be reconciled with other valuable assertions about how curiosity emerges. Notably, learning progress theories, widely applied to artificial agents, posit that curiosity is not solely driven by novelty but is precipitated by heightened rates of learning new information (Oudeyer et al., 2007). This framework implies that humans are intrinsically driven to pursue tasks featuring a learning-progress component (Ten et al., 2021), thus influencing both immediate engagement with the task at hand and the selection of subsequent tasks. This dynamic interplay ultimately contributes to an augmented understanding of the evolving environment, achieving desirable reductions in uncertainty (Poli et al., 2022).

Learning can be costly and success is never guaranteed. Therefore, having the ability to focus resources on areas where learning is most effective is highly advantageous. Even very young infants seem to possess an innate sense of where they can learn rather than where they might simply encounter random information (Gerken et al., 2011). Curiosity and exploration help us stay in the "zone of proximal development" (Metcalfe et al., 2020; Oudeyer et al., 2007), the optimal range for learning just beyond our current knowledge and abilities. Curiosity, as defined by learning progress theories, limits wasting valuable resources on irrelevant and overly simple content, as well as, importantly, content that is too complex for our current understanding.

Learning progress theories also explain how, with continued exposure to complex environments, those stimuli that elicit humans' curiosity, attention and preference will likewise tend to increase in complexity (Forest et al., 2022; Galvan & Omigie, 2022). Learning progress theories thus hold significant potential for explaining our everyday behaviours, including those related to the arts.

Indeed, there is increasing evidence from poetry, visual artworks and music suggesting that learnable novelty is the underlying factor behind curiosity and creative outputs. In the realm of music, research indicates that curiosity, reward and physiological signals are influenced by novelty, in different ways depending on the context's learnability (Bianco et al., 2020; Cheung et al., 2019; Omigie & Ricci, 2023). Concerning creativity, those musical compositions with moderate, rather than high levels of novel events (i.e., music intervals not previously heard), were judged by listeners as being the most creative (Zioga et al., 2020); importantly, the same study also demonstrated that success in learning a new musical style significantly predicted success in composing creatively in that new style.

Such learning-creativity associations align with findings that aesthetic appeal predicts creativity-related judgments and behaviours better than surprise per se (Welke et al., 2023, Chaudhury et al., 2023). Aesthetic appeal, which is well explained by individual differences in preference for complexity and novelty, is a stronger predictor than surprise of how creative poems are judged to be (Chaudhury et al., 2023). Interestingly, curiosity in the form of information-seeking has previously been argued to be the driving factor in both aesthetic experiences and creativity (Kenett et al., 2023).

Our artistic sense could be argued to be related to play, another behaviour that is filled with curiosity and exploration. A child will often choose unconventional objects to play with (Andersen et al., 2023). This behaviour is not driven by mere novelty seeking or a desire to signal fitness, as some theories suggest for art (Leder & Nadal, 2014); instead, it is likely rooted in intrinsic motivation to tackle challenging obstacles that, in turn, offer opportunities for learning and progress in understanding the environment. Artists may intentionally incorporate obstacles and challenges into their work. In doing so, they maintain its appeal, foster fresh learning opportunities, and benefit both themselves and their audience.

Taken together, we commend the authors for their emphasis on the links between creativity and curiosity and for asserting that distinct states of mind, namely exploratory and exploitative states, underlie different types of creativity and curiosity. Nevertheless, we argue that a more precise qualification of 'novelty-seeking' as the pursuit of learnable novel information provides a more comprehensive framework for understanding the similarities between creativity and curiosity. This conceptualisation would better align with a growing body of evidence concerning the nature of creativity and curiosity, both in the context of the arts (Gold et al., 2019; Matthews et al., 2023) and in general (Dubey & Griffiths, 2020). Such a definition would also better accommodate the notion that creative products, including various forms of artistic outputs, serve a recognisable and adaptive purpose.

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13. Competing Interests Statement

None

14. Funding Statement

None

15. Alphabetical Reference List

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