JoE

Journal of Expertise
2025. Vol. 8(4)

ISSN 2573-2773

Response to Commentaries on *The Psychology of Creative Performance and Expertise*

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Abstract

This article responds to eleven commentaries on *The Psychology of Creative Performance and Expertise* (Friedlander, 2024) and the accompanying target article published in this special issue (Friedlander, 2025). The special issue reflects both diversity of theoretical starting points and striking convergence around several shared propositions: that creativity and expertise can be treated within a unified explanatory framework; that multifactorial accounts are needed to move beyond single-cause explanations; and that expertise research benefits from engaging a wider range of domains, methods, and developmental trajectories. In addressing the commentaries, I clarify points of agreement and divergence, including the balance between creativity and expertise across chapters, the role of individual differences and structural moderators of opportunity, and questions concerning mechanisms of control and constraint in skilled performance. I also engage with critiques concerning embodied and enacted expertise, metacognition and metareasoning, and memory mechanisms, including the scope of long-term working memory. The response closes by outlining the pressing need for research on creative expertise under rapidly evolving social and technological conditions.

Keywords

performance, performing arts, creativity, expertise, multifactorial model of expertise, giftedness, talent, metacognition, embodied cognition, LTWM

Opening Thoughts: Framing the Response

I am grateful to Zach Hambrick, Guillermo Campitelli, and the editorial team at *Journal of Expertise* for the opportunity to contribute to this special issue, and to respond to the commentaries it brings together, as well as to the commentators themselves for their thoughtful engagement with the book. It has been both encouraging and instructive to see the work read from such a wide range of disciplinary and theoretical perspectives, and for the book to be received with such warmth and generosity. As a group, the commentaries do not converge on a single overriding critique; rather, they extend, challenge, and reframe different aspects of the book in ways that reflect the diversity of traditions represented. This seems entirely fitting for a volume that was intended less as a definitive statement than as a starting point for dialogue about creative performance and expertise.

Shared Ground

Despite the diversity of theoretical perspectives represented in this issue, there is striking convergence around three central propositions that underpin the book: the value of integrating creativity and expertise within a single explanatory framework; the need for

multifactorial accounts that go beyond single-cause explanations; and the importance of extending research beyond the traditional anchor domains of music, chess, and sport. Each of these points is taken up in turn in the sections that follow.

Creativity and Expertise

It is especially rewarding to see widespread endorsement of the book's attempt to reconcile the traditions of expertise and creativity, given that this synthesis was a key motivation for the work. Collectively, the commentaries in this issue now move beyond the question of whether reconciliation is possible, towards considerations of how creativity should be conceptualised, developed, embodied, and sustained within fields of expert performance.

Hoffman and Four-C Models

It was particularly reassuring to note that one of the co-originators of the Four-C model (Kaufman & Beghetto, 2009) finds clear value in its reconciliation with Hoffman's (2017) proficiency stages in Chapter 3. Kaufman's (2025) discussion helpfully critiques the internal heterogeneity of 'Pro-C', contemplating a mapping onto the distinction between the reliable but largely unremarkable productivity of Hoffman's 'Journeyman' and the more adaptive expertise of the 'Expert', better suited to genuinely challenging problems. At the upper end of the continuum, the alignment of 'Big-C' creativity with Master-level expertise also brings the current textbook into even closer alignment with Subotnik and colleagues' Talent Development Mega-Model (TDMM: 2017; 2025), in which the culmination of expertise is framed as eminence or transformational creativity. This positioning of Master/Big-C creative expertise also reflects Subotnik and colleagues' (2017) use of Chi's (2006) distinction between absolute and relative expertise, whereby absolute experts are recognised as authoritative masters of their domain, sometimes reshaping it, in contrast to relative experts whose contributions, while accomplished, do not carry the same field-level impact. As my book stresses, one of the particular attractions of Hoffman's model is its capacity to operationalise these distinctions within a graded structure, enabling more precise benchmarking of creative-expert performance both within and across studies.

Questions of Balance

Kozbelt's (2025) framing of this integration as both necessary for scientific progress and overdue, given the long-standing siloing of the expertise and creativity literatures, is particularly powerful, a point also made persuasively by Simonton (2025). Yet Kozbelt also notes that within the book, expertise is the "more consistent theme", with creativity appearing most strongly in Chapter 3, and less systematically thereafter. I agree with this analysis, and with Kozbelt's conclusion that this asymmetry is not idiosyncratic to the book but reflective of the current state of both the expertise and creativity literatures. As noted in Chapter 1, few multifactorial models of expertise include creativity as a core ability or personal attribute (see for example Ullén et al., 2015). Previously, we have therefore needed to turn to models from outside the expertise literature, such as Gagné's Differentiating Model of Giftedness and Talent (DMGT, 2014) or the TDMM (Subotnik et al., 2017); or indeed to the work of scholars whose research explicitly crosses both areas (for example Simonton's integrative research agenda for creative achievement, 2014). Simultaneously, there has been an apparent reluctance by those working in the field of creativity research to embrace expertise wholeheartedly as a facilitator of, rather than an obstacle to, creative production (see for example Chi, 2006).

Kozbelt's reflections on the long-standing debate concerning whether, and when, expertise may constrain rather than facilitate creativity serve as a useful reminder that this question remains actively contested. His observations that cases such as early conceptual breakthroughs, polymathy, and atypical lifespan trajectories pose challenges for an exclusively expertise-driven view of creativity find a clear echo in Simonton's (2025) contribution to this issue. In this context, I particularly look forward

to reading the forthcoming 'Goldilocks' account (Simonton, in press), in which the relationship between expertise acquisition and creative performance is proposed to follow an inverted-U rather than a monotonic function.

As Kozbelt notes, these issues are addressed most directly at the end of Chapter 3, where the book comes closest to an explicit synthesis of creativity and expertise. That this discussion does not culminate in a definitive resolution is, I would argue, appropriate for a textbook operating in a domain where the empirical and theoretical evidence remains unresolved and where reasonable disagreement persists. Subotnik and colleagues' TDMM (2017) similarly treats domain expertise as a necessary precursor to creative production, while explicitly acknowledging that this formulation raises further questions concerning the level of expertise required for creativity, and the extent to which this threshold varies across domains. For my part, I agree with Subotnik and colleagues that substantial domain expertise is particularly essential in STEM fields, for the production of elegant, and genuinely transformative solutions (as argued in Chapter 11). Yet throughout my discussion of Pro- and Big-C creativity in the performing and creative arts, I have also laid stress upon the importance of the 'architectonic eye/ear/knowledge', which is argued to allow comprehension of "the underlying messages of an artwork or product, its genre, period and creator, and the social and cultural context of its creation" (Friedlander, 2025, p.5). Accordingly, the book argues that much depends on the level of expertise attained (Journeyman, Expert, Master), the form of creativity aspired to (little-, Pro-, or Big-C), and the stage reached in an individual's career (early career, consolidation, stasis).

A further reason why creativity research has sometimes been reluctant to engage fully with expertise may lie in enduring ambiguities about who, precisely, counts as a creative agent. Across many artistic fields, creativity is most readily attributed to those who generate tangible or ideational products, such as sculptors, composers, writers, poets, or choreographers, where creative output is visible and readily locatable. Performers, by contrast, are often positioned as secondary figures, valued for fidelity, proficient execution, and high levels of training rather than originality. As a consequence, empirical work in the performing arts has tended to foreground technical aspects of eminent performance, most notably the role of deliberate practice, while treating creativity as peripheral. As Thomson and Jaque (2017) note in the context of music, this has contributed to creativity being under-explored in performance research, resting on the assumption that only composers and improvisers qualify as creative producers, while performers are cast as expert replicators. As discussed in Chapter 3, this maps closely onto Tannenbaum's (1997) distinction between producers and performers. Tannenbaum's model importantly distinguished between proficient and creative modes of operation in both spheres. While some forms of performance (and indeed production) are primarily reproductive, many expert performers work creatively to reinterpret, reshape, and revitalise existing material. Yet, where originality is expressed through interpretation rather than generation, creative expertise is less immediately visible, and consequently easier to overlook.

Future Directions for Exploring Expertise-Creativity Integration

With the rationale for integration established, the discussion can now turn to what an integrated programme might prioritise. The brief examples below draw out a few recurring suggestions that are both domain-grounded and methodologically tractable.

Improvisation

Returning briefly to the question of balance, one area I would have liked to develop further, had space permitted, is improvisation. This spans music, dance, theatre, and creative writing (rapping, stand-up comedy) in particular, and is touched on in the book both in the music chapter (Chapter 6) and later in relation to freestyle rapping (Box 9.3). Improvisation offers a particularly fertile context for examining the expertise-creativity interface,

precisely because it foregrounds the real-time generation of novel material under constraints. Existing work has understandably focused on cognitive and neurocognitive mechanisms, including the role of internalised schemas (such as riffs and licks), motor memory, divergent thinking, and, in some accounts, reduced frontal inhibition (for example, Abraham, 2018; Beaty, 2015; Benedek et al., 2014; Chen et al., 2020; Comeau et al., 2018). Yet improvisation is also an intrinsically social and contextual activity. Performers frequently describe 'feeding off' others in an ensemble, responding to audience cues, and co-constructing performative trajectories in ways that are difficult to capture using individualised cognitive paradigms alone (Frisk, 2014; Landert, 2021).

The relationship between improvisation and deliberate play (Côté et al., 2007) also warrants closer attention. Within the musical sphere, research has indicated that playful, enjoyable, peer-based musical activities contribute meaningfully to the development of mastery and musicianship (Lordo, 2021). Closely related to this are reports of flow, cohesion, and collective vitality during improvisation and jam sessions, where shared goals and mutual responsiveness appear central to both creative experience and expert performance (Forbes, 2021; Hart & Di Blasi, 2015). Taken together, these strands suggest that improvisation may provide an especially promising arena for future work seeking to integrate cognitive, embodied, social, and affective accounts of creativity within expert practice. Several of these issues also anticipate themes taken up later in this response, particularly concerning the embodied and enacted nature of creative performance.

Accidental Creative Expertise

A related line of thought is Kaufman's (2025) proposal of 'accidental creative expertise', a trajectory in which individuals may develop high levels of creative skill through long-term engagement in enjoyable, self-directed activities, without explicitly framing their efforts as practice or even recognising them as creative. I find this account compelling, and would add that deliberate play (Côté et al., 2007) may also be a key mechanism here: unlike deliberate practice, where the primary focus is on the outcome of the training, deliberate play is mainly driven by the enjoyment of participation, with improvement being a welcome but tangential by-product (Foster et al., 2025). As Kaufman notes, such trajectories may be particularly likely in domains where creative activity is intrinsically rewarding, cognitively manageable, and pursued as leisure rather than vocation. The widespread turn toward crafts and making activities during lockdown (Morse et al., 2021) provides a timely illustration, with increased engagement in practices such as home sewing, knitting, baking, gardening, and woodworking, many of which are rarely foregrounded in creativity research or recognised as expert domains, even though these may be more ecologically valid and socially embedded forms of creative expression (see also Kozbelt, 2025; Ross & Penny, 2025). These activities can involve substantial skill development over time, yet remain comparatively uncelebrated, in large part because they do not typically yield financial reward or professional status, and they are not regarded as aspirational 'high forms' of cultural expression.

Similar dynamics can be observed in other expert activities discussed in the book, such as cryptic crossword solving and setting (Chapter 4), where sustained engagement often takes the form of regular puzzle-solving rather than structured training, where there is minimal financial payoff, and where expertise is more readily recognised within niche communities than by the wider culture. The growing visibility afforded by social media platforms (such as the YouTube channel C*racking the Cryptic* - Chapter 4) and popular television programmes such as *The Great British Bake Off* and *The Great British Sewing Bee* (Box 12.4) has the potential to disrupt this pattern, occasionally bringing such domains into public view and enabling individuals to be reclassified from hobbyists to recognised experts.

Creativity Across Domains

A further point raised by Abraham (2025) concerns the domain-specific interpretation of creativity, illustrated through her detailed discussion of chess. I agree that what constitutes a creative act, and how it should be studied, will necessarily vary by domain, and that progress depends on making explicit how a given definition of creativity maps onto domain-specific practices. In chess, creativity is often framed in cognitive and problem-solving terms, centred on originality, insight, and the generation of non-obvious solutions within a tightly constrained system. Yet, as recent work by Scherbakova and colleagues (2025) demonstrates, chess tournaments themselves recognise creativity through 'brilliancy prizes' awarded for originality, elegance, and aesthetic value, and prominent players frequently describe creative expression as central to their engagement with the game. This suggests that even in paradigmatically cognitive domains, high performance carries expressive and aesthetic dimensions that are only just beginning to be measured systematically.

The book argues more broadly that performers, too, have problems to solve, whether these concern interpretation, communication, or the resolution of expressive tensions, and that the distinction between problem-solving and artistic expression is often overstated. What remains relatively unexplored, however, is whether creativity differs in systematic ways between those whose primary concern is to communicate or entertain an audience, and those driven by a more inward-facing necessity to create—what Piirto (1998) describes as the 'thorn that pricks'—and the prioritisation of artistic integrity over popular appeal (e.g. Babbitt, 1958). Addressing this distinction, which resonates with long-standing artistic accounts of internal compulsion, represents a promising direction for future work at the creativity-expertise interface.

Intrapersonal Aspects

Finally, several commentators' calls to broaden how creative expertise is conceptualised also invite closer attention to intrapersonal factors that have received comparatively little systematic attention. One such avenue concerns sensitivity, understood as heightened responsiveness to internal states and external context, which has been linked to creative potential yet remains under-examined in applied and occupational settings. Recent work has argued that sensitivity may shape how individuals engage with creative work, environments, and feedback, with implications for both creative output and wellbeing (Ilbury et al., 2024). A second line of enquiry concerns the deliberate use of mental imagery as a metacognitive strategy, which the book discusses in Chapter 12 as a potential driver of creative expertise across performance, artistic, and scientific domains. While imagery has traditionally been studied as a rehearsal tool, emerging accounts suggest a broader role in exploration, recombination, and conceptual expansion (Friedlander, in press). Together, these dimensions point to productive directions for future research seeking to understand how creative expertise is developed, sustained, and differentiated across individuals.

Multifactorial Accounts Of Expertise

Across the commentaries, there is striking convergence in support of the value of multifactorial accounts of expertise. Several contributors explicitly endorse the move away from single-cause explanations, recognising that sustained high-level performance emerges from the interaction of abilities, practice, motivation, and opportunity rather than from any one factor alone. Drake's (2025) case material on visual art prodigies, for example, is framed as direct support for a model in which precocious abilities, a strong 'rage to master', and intensive self-directed practice work together rather than in isolation. Simonton similarly welcomes the book's more balanced approach as evidence that the field has moved well past any simple equation of expertise with accumulated practice hours.

This consensus is further reinforced by those who situate the book alongside wider frameworks in talent development and

performance science. Subotnik and colleagues (2025) signal alignment between the present account and the TDMM, especially in the shared emphasis on multifactorial developmental pathways towards high-level performance. This coherence also reflects the book's use of giftedness frameworks such as Gagné's DMGT (2014). Waddell (2025) highlights comparable affinities with performance science, where the focus lies on the common psychological and behavioural processes that underpin expert practice across domains as varied as the concert hall, the clinic, and the lab. In addition, the book (e.g. Figure 3.5) draws attention to parallel models in the creativity literature such as Sternberg and Lubart's Confluence Theory (1996). Collectively, these convergences indicate that expertise research has now matured to a point where it is fully aligned with, and contributing to, broader developmental and interdisciplinary understandings of high-level performance.

A further point of convergence concerns the place of individual differences within expertise. Simonton's discussion of personality traits such as Openness to Experience, and their genetic underpinnings, reinforces the argument that some people may acquire expertise "better" or "faster" even under broadly similar training conditions. Drake's prodigies foreground the role of precocious skill and intense intrinsic motivation as conditions for entering into, and persisting with, demanding practice regimes. Abraham, in turn, uses her chess exemplars to underline that there is no single route to expert performance, and that experts within the same domain can differ markedly in the nature and quality of their expertise. These contributions collectively support a multifactorial model in which individual differences are not treated as residual variance, but as integral and important moderators of both the acquisition and the expression of expert performance.

At the same time, the special issue provides an opportunity to reflect on the treatment of Ericsson's legacy within expertise research, with the magnitude of his contribution being underscored by the number of contributors who reference the forthcoming third edition of the *Cambridge Handbook of Expertise and Expert Performance*. Delaney and Adams (2025), writing as close intellectual descendants, are broadly positive about the even-handed presentation of Ericsson's substantial contributions, and their limitations, in the book. Their commentary also raises an important conceptual point about how multifactorial models should distinguish innate traits from structural mechanisms of expertise development. Using the relative age effect as an illustration, they argue that some factors can appear "aptitude-like" because they predict elite outcomes, even though they operate through gatekeeping and accumulation of opportunity rather than inherent capacity. The growing literature on relative age in music, sport, and education, including recent work showing enrolment biases in music conservatory selection practices (Román-Caballero et al., 2025), affirms that this is an important point and that these dynamics deserve further systematic attention in future expertise research. Within my framework, such factors sit alongside gender or ethnicity as persona-level moderators, shaping access to opportunities and training through selector bias, and are therefore readily accommodated within a multifactorial model.

In a similar vein, several commentators underscore the importance of social and contextual mechanisms in shaping expertise trajectories. Subotnik and colleagues draw particular attention to gatekeeping processes, mentoring, social skills, and access to insider knowledge, showing how these factors can accelerate or impede movement along talent development pathways. Waddell emphasises the influence of evaluative cultures and expert judges in determining whose performances are recognised as excellent, while Killion's (2025) account of master-apprentice structures in music illustrates how access, exclusion, and bias operate in practice. Together, these commentaries reinforce the view that expertise is not solely a property of individuals, but is co-constructed through social structures, evaluative communities, and institutional practices that condition who is able to develop and display their skills. This underscores the value of

multifactorial models which embrace broader environmental, social and opportunity influences alongside personal qualities, aptitudes, and dedicated practice (see for example Figure 1.4 in the textbook).

Beyond Canonical Domains

Taken together, the commentaries also converge on a third point of consensus: the importance of moving beyond a narrow focus on canonical domains in order to understand how creativity and expertise interact across the full range of human performance. Several contributors explicitly welcome the book's attempt to extend discussion beyond the familiar terrain of chess, elite sport, and Western art music, through sustained treatment of domains such as dance, theatre, creative writing, art, and science. As Killion notes in his commentary, this approach is evident even within traditionally canonical fields such as music, where the book seeks to move beyond standard exemplars by engaging with a broader range of musical practices rather than restricting analysis to elite or Western forms alone.

The applied chapters were intended to open a dialogue rather than delimit it or to claim comprehensive coverage. The examples discussed throughout this response - including improvisational practices, craft-based activities, puzzle-solving beyond chess, and other forms of sustained, high-level engagement pursued outside formal career structures - help to illustrate why this broader remit matters. As argued above, in such domains, creative expertise may emerge through alternative trajectories characterised by deliberate play, cumulative participation, and delayed or partial recognition, rather than through clearly demarcated training pathways. This allows us to test out the universality of theories developed from the study of a restricted range of more solitary activities (such as playing chess, the violin or the piano) and to celebrate a wider range of human achievement.

In art and design, for example, there is clear scope to extend this conversation to include craft practices alongside more institutionally recognised professional domains. It is worth recalling that instruments such as the Creativity Achievement Questionnaire (Carson et al., 2005) were designed precisely to capture high-level creative engagement across a wide range of fields: visual arts, writing, humour, music, drama, dance, invention, science, culinary arts, and architecture (Chapter 2). Domains such as the culinary arts, in particular, offer rich opportunities for examining creative expertise, as they develop through sustained practice, evaluative communities, and culturally embedded standards, yet they remain comparatively under-examined within both the creativity and expertise literatures.

Commentaries on Mechanisms of Control and Constraint

A second cluster of commentaries engages less with the overall architecture of the book than with the mechanisms through which creative expertise is enacted, monitored, and constrained in real time. These contributions raise complementary questions about embodiment and situated action, about metacognitive regulation during production, and about memory processes in expert performance. I take these in turn below.

Enacted Expertise

Ross and Penny's (2025) commentary raises an important and well-established line of critique, grounded in embodied, enactive, and situated approaches to skilled performance. I welcome this intervention, not least because it highlights a productive tension between different explanatory traditions that have long coexisted somewhat uneasily in the study of expertise and creativity. The issue at stake here is not whether embodied, enacted, and socially situated skill matters. It clearly does. Rather, the question is how we may combine the cognitive and the embodied approaches to bring out the strengths of each.

It is true that the book does not attempt to foreground a comprehensive theory of embodied or enactive cognition; its purpose is to integrate psychological evidence on how creative expertise is learned, sustained, and authentically expressed. Within that remit,

embodied experience is treated as central rather than peripheral; but it is framed psychologically, as something that is also cultivated, stabilised, and regulated through training and expertise, rather than as the primary explanatory ground in its own right.

For this reason, and across multiple applied creative domains, including acting, dance, music, and writing, the book repeatedly returns to the idea that high-level creative performance depends on a carefully maintained balance between immersion and control. Actors in the 'Method acting' school, for example, are required to experience emotions 'for real' - 'living the part truthfully'. Chapter 8 highlights the role of empathetic and emotional congruency with the part to be played, and the role of literal enactment in supporting authentic expression "working from the outside in" (Blix, 2010, p.45; Noice & Noice, 2013). Writers, too, were shown (Chapter 9) to use incidents from their own life to evoke emotions that resembled those demanded by the text ('self-referencing', Noice & Noice, 2013) and to experience emotional congruency with their characters, reporting weeping or aesthetic chills as they wrote. Creative artists across a range of fields also report 'being in the moment', and the book discusses the importance of this immersive flow state for keeping the work fresh.

Yet, paradoxically, expert production in the performing arts must also be a finely tuned engine with all parties repeating the polished performance established by weeks of stringent rehearsal. As noted in Chapter 8, Blix (2010) argues that the actor is always balancing on the cusp of two identities: the character they are embodying, and the professional actor who is crafting the role ('double agency', Hastrup, 2004). Actors must therefore fully inhabit their part, while simultaneously monitoring timing, spatial positioning, and interaction with others. While rehearsal may automatise many of these aspects, unanticipated technical failures, such as a badly placed prop or a forgotten cue, can interfere with the smooth progress of the play, and the actor needs to be aware of and to remedy the situation while remaining in character (Blix, 2010). Across the performing arts, too much immersion, without discipline, leads to inconsistency and loss of technical reliability. Too much control, without immersion, leads to performances that are experienced as flat, mechanical, or inauthentic. What expert performers learn, through long training and repeated performance, is how to operate on this boundary.

This tension is not incidental. It is, I would argue, fundamental to creative expertise. Authenticity in expert creative performance fields and in creative writing is not merely a spontaneous expression of inner feeling, but an achieved and repeatable state, one that depends on bodily attunement, procedural skill, and situational responsiveness, while remaining constrained by craft. This dynamic can be observed in elite musicians and singers. Performers such as Annie Lennox (Chapter 6, Davidson, 2001) are widely celebrated for authenticity and emotional presence on stage, yet their performances are also highly structured, rehearsed, repeatable, and technically controlled. The capacity to appear unguarded on stage rests on years of disciplined bodily training and the ability to regulate one's own internal state in real time.

Audience experience is also relevant here. The applied chapters highlight embodied phenomena such as absorption, adhesion to fiction, aesthetic chills, and shared affect (audience contagion), culminating in a dedicated discussion of these terms in Chapter 12; yet these are not elicited reliably by undisciplined action. They depend on the performer's capacity to shape collective experience through timing, intensity, and precision, often through months, if not years, of intentional and meticulous preparation (Chaffin et al., 2010). From this perspective, embodied and enacted performance cannot be separated from cognitive control and the communication choices explicitly made in the practice room. The expert body is not simply acting in the world; it is acting under constraint, shaped by prior learning and oriented towards specific outcomes that must be reproduced across contexts.

Ross and Penny's critique is therefore perhaps best understood not as identifying a

neglect, but as highlighting a difference in emphasis and theoretical framing. Enactive approaches tend to foreground action-in-the-world as primary, whereas the present book treats embodied experience as something that is organised, stabilised, and made reliable through psychological mechanisms of learning, monitoring, and control. These positions are not incompatible, but they answer different questions.

Metacognition in Creative Expertise

If Ross and Penny are concerned that the account does not go far enough towards embodiment, Ball and Richardson (2025a) make the complementary case that metacognitive processes could have been made more explicit. Killion, too, comments that the chapter on music might have contained a greater focus on the moment-to-moment behaviours through which procedural knowledge is instantiated and refined. Ball and Richardson rightly note that the book does not offer any explicit conceptual synthesis of metacognitive or metareasoning processes in expertise, nor does it draw directly on their own very recent work in this area (Ball & Richardson, 2025b). Such a synthesis might indeed have fitted naturally within the discussion of facilitators of creative performance (Chapter 13), for example in the discussion of self-regulation, which drew on work by Gagné (1999; 2013).

That said, metacognitive processes are treated repeatedly across the applied chapters, albeit in a distributed rather than consolidated form, and often embedded within domain-specific accounts of creative work. For example, choreographers are described as engaging in an iterative dialogue with their developing work, repeatedly revisiting coherence, structure, and expressive intent as the piece evolves (Chapter 7). Writers are also shown to shift flexibly between phases of reduced self-monitoring during initial drafting and more effortful evaluative control during revision, including deliberate disengagement and later reactivation of an editorial mindset (Chapter 8). Chapter 10 also features a review of the Creative Art Process framework of Botella and colleagues (2013; 2018) which identified 17 different cognitive stages involved in visual art production, including reflection, testing, restructuring, and revision, rather than linear execution. Across domains, creators are described as generating excess material, selectively inhibiting or excising elements that do not serve emerging goals, and refining products through cycles of divergence and convergence: the ‘pea-pod’ model of creative ideation (Morse et al., 2025). Performing artists are also argued to formulate critical performance cues and content addresses while working to build up a secure mental representation of the desired polished delivery (Chapters 6-8).

Ball and Richardson’s commentary also usefully highlights how research into expert metacognition might be extended through the capture of internal processes through externalised approaches. The review by Ball and Christensen (2019) of design metacognition flags both think-aloud and observational studies as being of particular importance in understanding the elaborate, often hesitant, and deliberative reasoning which takes place during ‘reflection-in-action’ (Schön, 1983). Similar processes are evidenced in observational studies of musicians engaged in rehearsal - whether to achieve polished performance in the case of the cellist Lisboa (Chapter 6 - Chaffin et al., 2010; Lisboa et al., 2015), or to achieve mastery of target passages in the recent study of six expert trumpet players by Killion and Duke (2025). Other research methods might include Botella and colleagues’ Creative Process Diary (Chapter 10 - 2017) which captures the real-time sub-processes followed by student artists during their college assignments. Thematic analysis of autobiographical writing by professional artists across a range of performance fields could also shed light on commonalities and differences in the application of metacognitive knowledge, self-regulation and problem-solving approaches (so, for example, Svacha & Urban, 2024). Archival material can also shed light on the deliberate changes made to masterpieces during the development and art-making phases of the creative process (Chapter 10). Examples here

include analysis of emerging composition, such as the 45 preliminary sketches made by Picasso for the painting Guernica (Weisberg, 2004), and Kozbelt's (2006) study of 22 photographs showing the work-in-progress by Matisse on his picture Large Reclining Nude. Finally, Hogan and colleagues (2018) even explored the 'thinking dispositions' of aspiring fashion designers by analysing footage from an entire season of a popular reality television show '*Project Runway*' (Chapter 3).

Memory Goals and LTWM

While Ball and Richardson focus on how cognitive and metacognitive processes might be more explicitly traced in the book, Delaney and Adams (2025) raise a more targeted concern about how memory mechanisms are characterised within the broader synthesis. Their substantive concern relates to the treatment of long-term working memory (LTWM), which they suggest is framed too narrowly and insufficiently distinguished from skilled memory theory, chunking, and template-based accounts.

Their reading reflects a commitment to LTWM as it was originally intended by Ericsson and Kintsch (1995): a general framework for explaining how experts in semantically rich domains maintain access to task-relevant information without being constrained by traditional working memory capacity limits. From that perspective, my emphasis on LTWM in the context of mnemonic expertise, and on the explicitly constructed retrieval structures used in extraordinary memory feats, may appear to understate the theory's broader ambition of explaining general expert advantage in the retrieval and use of detailed, domain-relevant information.

The framing adopted in the book, however, reflects a judgement about how LTWM has been most convincingly supported and differentiated in the subsequent literature. While LTWM was proposed as a unifying account of expert cognition, its clearest empirical instantiations involve cases in which retrieval structures are deliberately established, metacognitively monitored, and trained for the purpose of memory performance (Gobet, 2000, 2015). Beyond the recognition-based mechanisms described by chunking and template theories, which characterise expert performance primarily through the rapid recognition of structured long-term representations (Gobet, 2015), LTWM posits additional mechanisms for maintaining selective access to newly encountered, situation-specific information during ongoing processing. Here, the use of a temporary, episodic memory-based, elaborative interface to recall material perfectly is not at issue (e.g. Konrad, 2014).

In contrast, attempts to extend the same mechanisms wholesale to naturalistic expertise have faced persistent challenges, especially where richly elaborated domain knowledge, arising organically from exposure to the field, appears sufficient to support expert performance without positing additional retrieval scaffolds. My viewpoint is not that experts lack rapid access to long-term memory, but that in semantically rich domains this access is typically afforded by the organisation of knowledge itself, rather than by the additional retrieval-structure mechanisms proposed by LTWM. Indeed studies of both medics and actors support this viewpoint: in think-aloud studies, expert doctors made less use of detailed biomedical knowledge than residents, relying instead on 'encapsulated knowledge' (pattern recognition and schema-based knowledge) for medical diagnosis (Jaarsma et al., 2014; Schmidt & Boshuizen, 1993). Similarly, although the recall of previously acted parts by repertory actors was impressive, Schmidt and colleagues (2002) found that the number of paraphrases used was quite large, suggesting that their recall of the script after five months relied on meaning-making during a fine-grained analysis of the text, in line with the theories of Noice and Noice (1993; 2013). These broader, schematic manners of recall, which ensure recovery of 'gist' rather than precision, are quite different from the deliberately crafted, temporary, episodic-based retrieval structures used to achieve pin-point precision in memory challenges.

In this sense, my treatment aligns with more

restrictive interpretations (e.g. Gobet, 2015) that reserve LTWM-style mechanisms for contexts in which they are demonstrably required: to support memory where the explicit goal is the improvement of recall. It treats expert memory in semantically rich domains as emerging primarily from dense, well-organised, long-term memory structures offering multiple, overlapping retrieval routes, with improvements in memory arising largely as a by-product of learning to perform effectively in the domain. As stated in the book, this position reflects a skill-by-structure (Lehmann et al., 2018) view of expert memory, according to which expert advantage arises from the gradual acquisition of increasingly complex, domain-relevant mental representations, without routinely requiring additional retrieval-structure mechanisms. This should not be read as a rejection of LTWM as a conceptual framework, but as a narrowing of its explanatory scope in the interest of parsimony.

Closing Reflections

In conclusion, a striking feature of this special issue is that it conveys convergence rather than fragmentation. Despite divergent theoretical starting points, the commentaries repeatedly return to shared commitments: that creativity and expertise can be productively treated within a single explanatory framework; that creative expertise cannot be reduced to single-cause explanations; that developmental and contextual factors matter alongside abilities and practice; and that the field benefits from looking beyond a narrow set of canonical tasks and domains. In that sense, the exchange reflects a maturing research area that is increasingly aligned with interdisciplinary approaches to talent development, creative achievement, and skilled performance.

Maturity, however, is not the same as closure, and this is not a moment for complacency. Expertise and creativity are now being negotiated in a wider social landscape characterised by contested authority, political polarisation, and shifting institutional incentives (Chapter 16). These pressures make it more important, not less, to clarify what we mean by expertise and creativity, how they are recognised and evaluated, who gets access to the pathways that produce them, and how they can be sustained in the face of substantial challenges.

Technological change intensifies both the opportunities and the stakes. Tools that support controlled yet ecologically valid performance settings, including simulation, VR, and mixed-reality environments, offer highly promising routes for research and training that can capture skilled behaviour under realistic constraints (Waddell, 2025). Yet generative AI also has the potential to disrupt expertise, not only by changing how creative products are produced, but by altering what learners practise and how, what gatekeepers reward, and what forms of competence become visible or valued. The field therefore needs to attend to both the enabling and the distorting effects of these tools, and to develop methods capable of tracking how expertise evolves in such tool-rich environments.

My hope is that *The Psychology of Creative Performance and Expertise* can provide a useful platform for this next phase, supporting exploratory dialogue while encouraging the conceptual and methodological clarity needed to meet these emerging challenges. Several commentators also warmly welcome the book as a teaching text, and it will, I hope, serve as a practical resource for those training the next generation of researchers and practitioners in the field.

Author's Declarations

The author declares no personal or financial conflicts of interest regarding the content of this article and no sources of funding. The author does, however, acknowledge that royalties will be received from Routledge for the publication of the book (Friedlander, 2024) on which this article is based. I am particularly grateful to the publishers for making copies of the textbook available for reviewers.

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Received: 2 January 2026
Accepted: 8 January 2026