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Engaged and Confused: Aesthetic Appreciation of Live and Screened Contemporary Dance

Haeun Lee^{1, 2}, Charlie Ashwell^{1, 3}, Matthias Sperling^{4, 5}, Laura Rai², and Guido Orgs²

¹Department of Psychology, Goldsmiths, University of London

²Institute of Cognitive Neuroscience, University College London

³Independent Dance Artist and Dramaturg, London, United Kingdom

⁴Independent Artist and Choreographer, London, United Kingdom

⁵Siobhan Davies Studios, London, United Kingdom

Aesthetic cognitivism assumes a positive relationship between aesthetic experience and knowledge acquisition. Here, we study this relationship in the context of contemporary dance. 207 audience members watched either a live performance or a screening of a contemporary dance duet and reported on their aesthetic experience after the show. Qualitatively, a thematic analysis of open questions revealed that the audience recalled the performance in both descriptive and imaginative ways, highlighting ambiguity and meaning making as recurrent ways of engagement. Quantitatively, a principal component analysis revealed two distinct dimensions of aesthetic experience: engagement and confusion. Simple group comparisons suggested that engagement was higher in the live than in the screened performances and among spectators not equipped with additional measurement devices (mobile electroencephalograms). However, these effects disappeared when prior dance experience was taken into account. In contrast, perceived confusion did not depend on live or screened performance context, wearing measurement devices, or prior dance experience. Our findings suggest that dance experience is an important predictor of how people engage with dance across both live and recorded performance contexts. Moreover, we show that ambiguity and confusion are not necessarily aversive components of aesthetic experience but can be experienced as artistically intended features of an artwork, and in the process become a form of engagement, more so if viewers have sufficient experience with the art form. Our findings therefore challenge a conceptualization of aesthetic experience as a simple by-product of insight and suggest a distinction between pleasure from experiencing and pleasure from understanding.

Keywords: aesthetic cognitivism, liveness, dance, expertise, ambiguity


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Engaging with art allows one to experience emotions and imagine ideas and worlds beyond everyday life: few of us will travel to the moon, but paintings, films, and science fiction books may allow us to experience the awe of exploring the universe (Keltner, 2023; Mouriki & Mouriki-Zervou, 2011). Linking aesthetic experience to learning and knowledge acquisition has a long history in empirical aesthetics. Aesthetic cognitivism proposes that art appreciation is linked to knowledge acquisition, understanding, and meaning making (Christensen et al., 2023). This view, most recently articulated in predictive coding accounts of aesthetic experience, often implies that the most compelling artworks are those that provide an opportunity for learning or discovery (Van de Cruys et al., 2024). In this view, confusion is an ultimately aversive experience that requires

resolution to become enjoyable (Kesner, 2014; Silvia, 2013). In this study, we challenge this specific notion of an inherently positive relationship between engagement and understanding from the perspective of contemporary dance. In short, we argue that understanding what a specific contemporary dance work “is about” is not a necessary requirement for engaging with it. In fact, confusion without subsequent resolution may be an important and even desired feature of some artworks, see Pepperell (2024) for a similar perspective from the visual arts.

Rather than as pleasure from understanding, the aesthetic experience of contemporary dance and other performing art forms that do not necessarily employ mimetic representation, linear narrative, or storytelling may be better understood as pleasure from experiencing,

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Haeun Lee  <https://orcid.org/0000-0002-6262-6899>

Guido Orgs  <https://orcid.org/0000-0003-3725-3979>

Haeun Lee and Charlie Ashwell contributed equally as cofirst authors.

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Correspondence concerning this article should be addressed to Guido Orgs, Institute of Cognitive Neuroscience, University College London, Alexandra House, 17–19 Queen Square, London WC1N 3AZ, United Kingdom. Email: guido.orgs@ucl.ac.uk

that is, one's immersion in the artwork and the atmosphere that is created through live art in a specific space over a defined duration (Sauter, 2021). In other words, we argue that understanding what an artwork is about may or may not be relevant to engagement with the artwork, and this relationship may well be specific to different artworks, art forms, and styles.

Pleasure from experiencing is closely related to the concept of liveness (Auslander & Auslander, 2008; Phelan, 1993). Historically, the performing arts, in particular dance and theatre, are staged as live events with a specific duration (traditionally the length of an evening, however longer in durational performances, e.g., Heathfield & Glendinning, 2004; Heathfield & Hsieh, 2009) and in a particular location (apart from digital theatre, e.g., Simou, 2022) in which both performers and spectators are copresent (Fischer-Lichte, 2008). In this article, we define liveness psychologically as a combination of objective features of a performance and subjective features of the audience's experience. Conceptually, we distinguish physical liveness (experiencing a performance in a defined here and now) from social liveness (experiencing an event together with other people). Empirical research has primarily focussed on physical liveness in the context of music concerts, for example, comparing the experience of a live concert to that of a recorded one. Shoda et al. (2016) found that in a live piano concert, audience members' heart rate changed according to the tempo of the music, more so than when they attended the recorded version of the concert 10 weeks later. Another study (Bernardi et al., 2017) found that interpersonal synchronization in cardiovascular, respiration, and blood flow distribution had increased during a live organ concert, compared to a recorded one. On the other hand, Belfi et al. (2021) compared people's continuous pleasure while they were attending a live concert in a communal venue or a recorded concert in an isolated lab setting and discovered that the congruency between the song and the musician had stronger impact on pleasure than liveness. However, only the live concert increased people's liking toward one specific band after watching them perform. It was also found that people show more vigorous head movements during a live concert compared to the recorded playback event, and this effect was more prominent if they were fans of the musicians (Swarbrick et al., 2019). Conjointly these studies suggest that seeing a music performance live may explain a certain degree of audience enjoyment, yet it is not always clear from these studies whether greater enjoyment is due to the presence of others (social liveness) or the difference between a music concert and a music recording (physical liveness).

In this study, we focused on the experience of engagement and confusion in the context of a live or screened contemporary dance performance. We explored two research questions using a mixed methods approach: first, we explored qualitatively to what extent spectators make explicit links between their aesthetic experience and the understanding of the choreography—we were specifically interested in the relationship between actual or desired understanding of what the dance work “is about” and people's engagement with the dance work, using thematic analysis on open questions answered by spectators after watching the performance. Second, we performed exploratory factor analysis on questionnaire items to quantify relevant dimensions of their dance appreciation. We expected to find engagement and understanding to be clearly dissociable dimensions of dance appreciation, both quantitatively and qualitatively. Moreover, we explored whether prior experience with dance was a more important predictor of engagement than

the context in which the performance was experienced, that is live or screened, or with or without wearing physiological sensors and a mobile electroencephalogram (EEG).

Method

Dance Performance—*Detective Work*

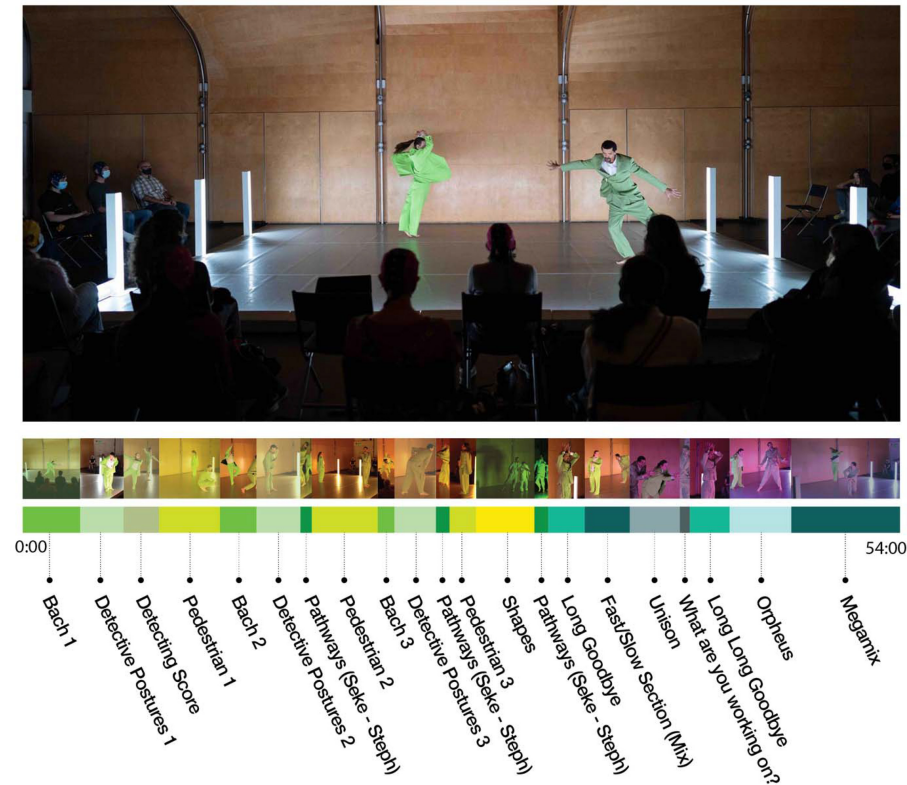
Detective Work is a contemporary dance performance created and performed by choreographer Seke Chimutengwende in collaboration with dance artist Stephanie McMann, and commissioned as part of the NEUROLIVE project, see <https://neurolive.info/Performance-1> for full credits, details as well as a short trailer. A full-length video is available at <https://youtu.be/1X8W5Ssaaos>. From an artistic perspective, *Detective Work* investigates choreography as a process of making and solving mysteries. The approximately 1-hr-long piece is arranged in 21 short choreographic sections that contrast markedly with each other in their atmospheres and movement dynamics, often abruptly shifting from one to the next. These choreographic sections are composed of both improvised and set movement material. In *Detective Work*, this distinction refers to movement generated spontaneously by the performers in the moment, and movement sequences that are predetermined and therefore largely repeated in the same form each time.

The structure and content of the performance aim to simultaneously generate, embody, and observe the experiential dynamics of mystery and ambiguity as they unfold in the performance. The movement material and sound score reference the investigative work of detectives, including postures, gestures, attitudes, modes of attention, and sounds, but without providing a single linear narrative or interpretation of what the performance is about. In the compositional structure of the performance, several of its short choreographic sections reoccur a number of times, each time with slight variations or reconfigurations. As well as being analogous to the principle of counterpoint often employed in musical composition, these reoccurring events create an environment for the investigation of mystery as a subject of the choreography: as in a detective's process of solving a mystery, the performance repeatedly retraces its steps through particular events, each time combing the terrain from a slightly different angle or applying a different lens, looking for potential new clues, understandings or relations that may emerge. Rather than being just a representation of the dynamics of mystery and ambiguity, this structure of the work actualizes an embodied environment—experienced by audience members and performers alike—that affords sensing, investigating, and reflecting upon these dynamics. Figure 1 shows an overview of how the repetition and variation of movement sections were composed across the duration of the performance.

The piece was performed in a dance studio space (Roof Studio) at Siobhan Davies Studios, London, United Kingdom. The performance space (gray floor, 16.7 m × 12.5 m) was surrounded by audience seating on three sides of the stage (see Figure 1, top), with 12 participants on either side and 19 participants in front for each performance. *Detective Work* was first performed live over three nights, on the 11th, 12th, and 13th of November 2021. The performance from 13th November was recorded on two cameras and then edited by a filmmaker into the film version of *Detective Work*, which was shown to different groups of audiences over three afternoons, on the 25th, 26th, and 27th of April 2022, in the Goldsmiths Cinema (94.06 m², 101-seat theatre). The full video of the filmed version

Figure 1

Staging and Structure of Detective Work by Seke Chimutengwende in Collaboration With Stephanie McMann



Note. Performance space layout (top), choreographic sections of *Detective Work* (bottom). See the online article for the color version of this figure.

of *Detective Work* is available to view here (<https://youtu.be/1X8W5Ssaos>).

Participants

In total, 207 spectators completed questionnaires after watching either live or screened versions of *Detective Work*. Seventeen participants did not fully complete the questionnaires and were excluded, resulting in 190 data sets for the quantitative analysis. Detailed demographics of the participants (N , M_{age} , SD , $range_{age}$, gender) for both live performance and performance screening are summarized in Table 1. The number of EEG participants was limited by the number of available devices (maximum 23 per each live performance and 15 for each screening), and the number of participants without wearing sensors was matched to the number of EEG participants. The final number of audiences was decided with the artists, considering the configuration of the audience seating. For the qualitative analysis, 174 out of 207 audience and 30 extra audience from the pilot dress rehearsal completed the open questionnaire; thus, 204 participants' responses were considered. All participants from the live version of *Detective Work* paid either £10 (general) or £7.50 (bursary) for their ticket. All participants from the screening *Detective Work* were compensated for their contribution, with £20 for the audience wearing mobile EEG and £5 for the audience not wearing EEG. All participants from both the live performance and the screening had given their informed

consent. The ethics board of Goldsmiths, University of London approved the research undertaken in this article.

Preperformance Survey

The preperformance survey collected information on spectator demographics and dance experience. Participants completed the Goldsmiths Dance Sophistication Index (Gold-DSI, Rose et al., 2022). The Gold-DSI is a 26-item questionnaire that captures experience in dance participation and dance observations. Dance participation is composed of four secondary factors, dance training (three items), urge to dance (five items, e.g., "When I dance, I feel better"), body awareness (six items, e.g., "I am aware of my body and how I hold myself"), and social dancing (six items, e.g., "If someone asks me to dance, I usually say yes"). Another general factor is dance observation, which is captured by six items, for example, "I like watching people dance."

Postperformance Survey

To capture the aesthetic experience of *Detective Work*, we devised a new survey, expanding from an existing questionnaire that was initially designed to measure the immediate impact of aesthetic experience in the live performing arts (Brown & Novak, 2007; Brown & Novak-Leonard, 2013), in conjunction with inquiries directly raised by dance artists. In "Assessing the Intrinsic Impacts of a Live

Table 1
Participant Demographics (Quantitative Analyses)

Participants	Live	Screening	Total
<i>N</i>	132	58	190
EEG	62	43	105
Non-EEG	70	15	85
Age, <i>M</i> (<i>SD</i> , range)			
EEG	34.65 (13.02, 19–82)	31.93 (12.95, 22–77)	
Non-EEG	38.58 (14.13, 20–80)	30.27 (6.85, 21–43)	
Gender, total <i>n</i> (%)			
Female	39 (29.55)	37 (63.79)	76 (40)
Male	16 (12.13)	13 (22.41)	29 (15.26)
Nonbinary	7 (5.30)	3 (5.17)	10 (5.26)
Unknown	70 (53.03)	5 (8.62)	75 (39.47)
Gender by ticket type, <i>n</i> (%)			
EEG			
Female	31 (50.0)	26 (60.47)	57 (54.29)
Male	13 (20.97)	9 (20.93)	22 (25.88)
Nonbinary	5 (8.06)	3 (6.98)	8 (7.62)
Unknown	13 (20.97)	5 (11.62)	17 (16.19)
Non-EEG			
Female	8 (11.43)	11 (73.34)	19 (22.35)
Male	3 (4.29)	4 (26.67)	7 (8.24)
Nonbinary	2 (2.86)	0	2 (2.35)
Unknown	57 (81.42)	0	57 (67.06)

Note. EEG = electroencephalogram.

Performance” (Brown & Novak, 2007), the authors have introduced the measurement of “intrinsic impacts” composed of six constructs: (a) captivation: the index which measures how absorbed an individual feels during a performance; (b) intellectual stimulation: the index encompassing various individual and social aspects of cognitive engagement; (c) emotional resonance: the index measuring the degree of empathy and emotional response from the audience; (d) spiritual value: the index addressing the experience beyond intellectual or emotional engagement and measures whether the audience had a transcending aesthetic experience; (e) aesthetic growth: the index measuring the degree to which the audience was introduced to a new style or aesthetics by the performance; and (f) social bonding: the index addressing the degree to which the audience felt connected with other individuals, celebrating one’s own or learning about others’ cultures leading to an inspiring experience on new human relations. Notably, in a report completed by 1,945 individuals from 19 performing arts events (e.g., music concert, ballet, theatre, and musical), captivation was found to be the index that correlated mostly with satisfaction, and the majority of items were highly correlated with one another (Brown & Novak, 2007).

Out of the 23 original questionnaire items, we selected and simplified 15 items (e.g., for captivation, “To what degree were you absorbed in the performance?” was edited to “I was absorbed in the performance”). In addition, 12 questions were added, where items were based on the discussions that occurred during a 1-week workshop by NEUROLIVE (<https://neurolive.info/Workshop-1>) which brought 16 dance professionals and academics together (Table 1, A1, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14), and lastly an item “The performance moved me” was added from the Aesthetic Emotions Scale (Schindler et al., 2017), in total creating 28 items for current experiment (see Table 2 for the full set of items). All questionnaire items adopted a 7-point Likert scale, where Items A1–A14 had *disagree* as 1 and *agree* as 7, and Items B1–B14 had *not at all* as 1 and *a great deal* as 7.

At the end of the postperformance survey audience members were asked: “In roughly 100 words, can you describe what happened in the performance? Was there a specific moment that stood out to you?” This question was deliberately worded to draw out what audiences remembered, what caught their attention, and what stood out to them, as opposed to what they liked or disliked about the performance. Asking “what happened” allowed people to relate what they saw and experienced in as open a way as possible. Our intention was to minimize any assumptions of particular modes of viewing on the spectator’s behalf. The written responses from the performances and the screenings were transcribed in chronological order of the performances, but not organized in any other way. Each audience member was then assigned a number: A1, A2, A3, alongside their unique audience code, to enable cross-referencing of any particular audience response (for the full transcription, see Supplemental Material S1 in the online supplemental materials).

In addition, we recorded participants’ mood changes by using the self-assessment manikin (SAM; Bradley & Lang, 1994) on happiness and excitement, which were collected twice, before and after the performance or screening of *Detective Work*.

Data Analysis

For quantitative analyses, we used principal component analysis (PCA; Pearson, 1901; Wall et al., 2003) adopting a correlation-based PCA with singular value decomposition (prcomp function in R) to explore the correlations between the questionnaire items—composed of multiple batteries that have not yet been validated in contemporary dance research, with the direct inquiries from the dance artists—in order to identify underlying dimensions of the aesthetic experience of this particular dance performance. Using linear models, we then tested whether these dimensions depended on physical liveness by comparing live and screened performances and including observational and participatory dance experience as

Table 2
Postperformance Questionnaire Items and Indices

Postperformance questionnaire items	Indices
A1. I enjoyed the performance	Aesthetic appreciation (Neurolive)
A2. I was absorbed in the performance	Captivation, modified (1, Brown & Novak, 2007)
A3. The performance moved me	AESTHEMOS (Schindler et al., 2017)
A4. I'd like to see the performance again	Aesthetic appreciation (Neurolive)
A5. The performance held my attention	Attention (Neurolive)
A6. I feel like I could relate to the performance	Emotional resonance (Neurolive)
A7. The performance confused me	Intellectual stimulation (Neurolive)
A8. At any moment during the performance, I was curious what would happen next	Intellectual stimulation (Neurolive)
A9. During the performance, I found myself thinking about other things	Attention (Neurolive)
A10. At times I felt like time stood still	Attention (Neurolive)
A11. I noticed every moment of time passing	Attention (Neurolive)
A12. Attending the performance heightened my senses and made me acknowledge my immediate surroundings more vividly	Attention (Neurolive)
A13. I feel like I experienced the same emotions as the performers while watching the performance.	Social aesthetic experience (Neurolive)
A14. I feel like I experienced the same emotions as the other spectators while watching the performance.	Social aesthetic experience (Neurolive)
B1. To what extent did you inhabit the world of the performers, lose track of time and forget about everything else?	Captivation (2, Brown & Novak, 2007)
B2. How much did the performance make you think?	Intellectual stimulation, modified (3, Brown & Novak, 2007)
B3. How much were you provoked or challenged by the performance?	Intellectual Stimulation, modified (4, Brown & Novak, 2007)
B4. To what extent did the performance cause you to reflect on your own opinions or beliefs?	Intellectual stimulation (5, Brown & Novak, 2007)
B5. To what extent do you feel that you understood the performance?	Intellectual stimulation, modified (6, Brown & Novak, 2007)
B6. Did you have a strong emotional response to the performance?	Emotional resonance, modified (9, Brown & Novak, 2007)
B7. To what extent did you relate to, or feel bonded with one or both of the performers?	Emotional resonance (11, Brown & Novak, 2007)
B8. To what extent was the performance therapeutic for you in an emotional sense?	Emotional resonance (12, Brown & Novak, 2007)
B9. How much did the performance leave you feeling uplifted or inspired?	Spiritual value (13, Brown & Novak, 2007)
B10. To what degree did you pass into a different state of consciousness for a period of time?	Spiritual value, modified (14, Brown & Novak, 2007)
B11. To what extent did the performance leave you feeling empowered?	Spiritual value (15, Brown & Novak, 2007)
B12. To what extent did you feel a sense of belonging or connectedness with the rest of the audience?	Social bonding (21, Brown & Novak, 2007)
B13. To what extent did you feel a sense of belonging or connectedness with the performers?	Social bonding (22, Brown & Novak, 2007)
B14. Did the performance leave you with new insight on human relations or social issues, or a perspective that you didn't have before?	Social bonding (24, Brown & Novak, 2007)

Note. AESTHEMOS = Aesthetic Emotions Scale.

additional predictors. Secondly, we tested whether the spectator experience was affected by wearing a mobile EEG. Lastly, we conducted two 3-way mixed analyses of variance to test the effect of between-subject factors: performance format (live vs. screening), engagement type (wearing EEG or not), and within-subject factor of attending to *Detective Work* on people's mood changes.

The approach to analyzing and interpreting the qualitative data was directly informed by the artistic process of making *Detective Work* and was conducted by one of the authors of this article and dramaturg of *Detective Work* (Charlie Ashwell). This mode of responding to the qualitative data allowed us to identify if and to what extent the choreographic intentions, strategies, and devices used in the conception and creation of *Detective Work* met the audience's focus. We were particularly interested in how a central idea of *Detective Work*, that is, choreography as a process of generating and solving mysteries, would resonate with audiences' comments and reflections. Answers to the open questions were transcribed and grouped into themes based on different ways of writing about "what happened."

Procedure—Live Performance

To attend the live performance of *Detective Work*, spectators purchased their tickets via the website of the performance venue,

Siobhan Davies Studios, London, United Kingdom (<https://www.siobhandavies.com/events/neurolive-detective-work/>). The event was advertised as both a live performance and a scientific experiment. During the online booking process, the participants could choose either a "performance only" ticket or a "performance + EEG participation" ticket. Spectators who purchased a "performance only" ticket either completed pre- and postperformance surveys or simply watched the show without participating in data collection. Spectators who purchased the "performance + EEG participation" ticket were equipped with mobile EEG (ANT Neuro, eego sports, 32-channel) and respiration sensors (SleepSense) before the show. Findings from EEG analyses will be reported in a separate article. A few days prior to their performance date, all participants were contacted via email and were asked to provide informed consent and complete the preperformance survey containing Gold-DSI (Rose et al., 2022). Participants who had not completed the preperformance survey online at home were provided with a printed copy that they completed immediately before or after the performance. All audience members were guided to the performance space, and the performance began shortly after the completion of a brief mood questionnaire. Immediately after the performance had ended, all audience members were asked to complete another brief SAM mood questionnaire and a printed version of the postperformance survey while they were still seated, reflecting on what they had just experienced.

Procedure—Performance Screening

The procedure for the screening of *Detective Work* was similar to the live performance but with a few important distinctions. Participants were recruited via an Eventbrite website that was advertised mostly to students in Goldsmiths, University of London (<https://eventbrite.co.uk/e/screening-of-detective-work-a-live-performance-recording-tickets-296886995997>). The experiment was advertised as both a screening event of *Detective Work* and a scientific experiment. During the online booking process, the participants could choose either “screening only ticket” or “screening + EEG participation ticket.” The EEG participants were set up with a respiratory sensor, skin conductance sensor (eego sports), and EEG prior to the screening. All participants gave responses to an online presurvey (Gold-DSI, Rose et al., 2022). When the last participants had settled in their seats, the film version of *Detective Work* began to play on the screen (16:10 ratio, 7.1 sound system with 2K projector). After the screening, all audience participants were asked to complete the postperformance survey as they were sitting in their seats while reflecting on what they had just seen. Before and after the screening, participants also completed a brief mood questionnaire.

Results

We first report the qualitative results, followed by the factor analysis of the postsurvey items. The findings from the qualitative analysis will inform the naming of the dimensions discovered in the quantitative analysis.

Qualitative Results

Qualitative results are based on structured questionnaires that were collected among audience members after watching *Detective Work* both as a live performance and as a screening. We identify specific themes that came up among audience members and discuss their relationship to both theories of liveness and the artistic intentions of the work. These themes include interpretations and discussion of the “meaning” of the work, what it “represented,” and who the performers “were”; feelings that the performance brought up for the audience such as confusion, delight, amusement, or boredom; specific moments which “stuck” in the audience’s memory; and other artistic elements of the work which stood out in the audience’s attention, such as costume, lights, and sound.

Audience Accounts of “What Happened” and “What Stood Out”

Two people [...] find themselves in a space they don’t know very well. They seem to be looking for something, there is a lot of looking at the space, sometimes at us. They rarely acknowledge each other. Never touch. They are repeating 3 movement phrases, travelling in the space. Once they both stood and smiled for ages. The questions were a moment that stood out to me. (A83)

Here, we will discuss the section of the postperformance questionnaire which asked the audience to “describe what happened” in the performance, including “any moments which stood out” to them.

In the first instance, it is interesting to note that we did not find any notable distinction between the written responses of the live performances compared with the written responses of the dance video screenings nor between the people wearing EEG equipment and

those who were not. While occasional reference was made to an audience members’ awareness that they were in a screening, or that they were wearing EEG equipment, the dominant patterns which emerged from the responses cut across these different experiences of watching the work. Across both live and screened versions of the dance work, what came across most strongly is that *Detective Work* seems to immerse people in its mystery making.

The Descriptive Versus the Imaginative; the In-Fact Versus the As-If

The first thing we noticed about the way people responded to the question of what happened in *Detective Work* was a distinction between descriptions of what was actually happening in the work (the descriptive) and what seemed to be happening (the imaginative): between the material of the work—what was happening in fact—and the more speculative level of the work—the as if. By imaginative here, we are not referring to a story or linear narrative, but rather to the impressionistic resonances of the work that go beyond what was actually happening on stage.

Audience members who noticed, remembered, or recounted what happened in fact often referred to choreographic structures and forms, for example, “repetitions,” or “patterns” of movement material: “Repetition of movement sequences, shortened, mixed up, interrupted by new material” (A58). “Patterns of choreography repeated noticeably, but in different arrangements, variations and permutations” (A101). Repetition was also often the first thing people mentioned, appearing as one of the central structural features of the work. As well as movement content and structure, they noted other factual elements such as lighting colors and changes, costumes, and music.

Some audience members commented on what they perceived as improvised movement and what they perceived as “set” movement material: “Two performers explored a series of set movement phrases that they improvised around” (A22). Within this, there was often some doubt around which parts of the material, or to what degree the material was improvised or set: “The movement felt slightly improvised or that there was a score, but then there were also set movement phrases that repeated over and over again & changed in effort” (A45). Within this descriptive register then, there was also a dimension of speculation around how things were created and put together, not only spatially and structurally, but also over time.

Alongside this descriptive register, people also engaged on a more imaginative level, the as if: “Two people are looking for something, they are suspicious and there must have been something going wrong” (A136); “The performance seemed to be about investigating, being curious, being confused and blame” (A26); “The performers seemed to be colleagues on a journey of discovery” (A33). People entered the imaginative realm of *Detective Work*, even as the relatively abstract nature of Chimutengwende and McMan’s dancing complicated any straightforward interpretation of what was happening.

People also moved between and connected the descriptive and the imaginative without necessarily collapsing into assumptions about what the performance meant on a traditional narrative or representational level. “The performers seemed locked in a repeating loop of time—like Groundhog Day” (A34). In these responses, audience members interpreted associative meanings through their engagement with various aspects of the form or content that they encountered in the performance, without requiring the presence of a single overarching narrative.

In many people's writings, there was even a sense that the description of what happened—and, by association, the memory itself—had an element of invention to it. The journey from reception to recollection to description entailed a shift from the “raw material” of perception to the creative material of writing, via each individual's memory, which grasped and worked with the shared material of the performance. In this way, the active, embodied reception of the material became part of its recreation in language. “I saw searching for something both outside of oneself and inside. I saw coworkers” (A59). Sometimes this spilled into a poetic, associative, fabulatory way of remembering and writing, “Working, over working, stock exchange, overwork, stop, notice world for a moment, back to work, dystopian, date” (A124). These kinds of responses indicate that in some ways, the work has a relatively democratic relationship to meaning. Rather than requiring the audience to understand one particular meaning which is the sole creation of the artist and transcendent to the event itself, the creation of meaning is immanent to the live process of performance itself, leaving space for doubt, transformation, and mystery in its encounter with an audience. “They *appeared* to ‘figure it out’ by joining together in unison with manic smiles” (A89, emphasis added).

In this mode of performance where ambiguity is prioritized over rigid sense making, appearances can be deceiving but they are also alive with the possibility of making meaning anew. In this way, audience responses reflected the lack of a clear and binary distinction between the factual and the fictional, the representational and the abstract, the depicted and depictive scene (Orgs & Cross, 2023), or acting and not acting (Kirby, 1987). Live performance, particularly experimental, postdramatic choreographic works like *Detective Work* in which plot and storytelling are no longer the primary organizing principle of performance making (Lehmann, 2005), present performers and audiences with these opportunities to observe and practice this meaning making in action. In other words, it is the creative and idiosyncratic act of meaning making that underlies engagement—or disengagement—with live performances and choreographic works in this artistic tradition.

People Get Confronted With the Limitations of Their Understanding

I have no idea. (A206)

Not all audience members embraced ambiguity and speculation so easily. For some, the performance evoked feelings of frustration at not being able to “understand” what was happening or what the performance “is about.” This frustration was often accompanied by a normative assumption that the work has a fixed meaning or narrative “behind” it, that could or even should have been understood.

As one person wrote: “As a novice in the field of dance, I didn't read the language of the performance well and felt I missed a lot of the meaning” (A47). For some audience members, the complex network of allusions, resonances, and references that the work invites alongside its more abstract choreographic forms posed a barrier of unreadability and confusion that blocked rather than enabled their engagement with the work. Others felt lost or confused but were able to hold those feelings while also appreciating the work beyond its capacity to elucidate meaning: “I didn't have a grasp of a narrative but that didn't matter to me” (A4); “after realizing that the performers were repeating movement sequences I let go of the need to fully

‘understand’ the performance (as a narrative) and enjoyed the performance/skill of the performers in themselves” (A72).

“What happened is a hard question—so much went on” (A94). Here, the audience member also indicated that the work potentially exceeded their cognitive capacity to fully understand what was going on. The work was experienced as too much to take in, to recall, or to describe in words. The very fact of being asked to put into language “what happened” confronted the audience with the limitations of memory and language itself. If the work operates at the edge of sense making itself, how to go about putting into words what happened?

Audience members can thus experience ambiguity either as a welcome and rewarding invitation to engage in sense making and meaning making, accepting in the process that there may be no singular or correct way of engaging with the work, or experience ambiguity as potentially threatening and aversive, reflecting either a perceived deficit on behalf of the performance maker in conveying a clear and easily understandable message, or as a deficit in themselves, either of cognitive capacity to understand and process the work or lack of experience with the art form. Prior research in the visual arts, music, and dance has indeed shown that these two kinds of emotional reactions map onto individual differences in personality traits like “openness to experience” or “need for cognitive closure.” People scoring high on openness to experience or low on the need for cognitive closure (Silvia et al., 2015; Webster & Kruglanski, 1994) appreciate more complex and ambiguous artworks. Across the visual and the performing arts alike, such artworks request from the spectator a preparedness for only a partial or fragmented understanding of the meaning and structure of the work. Ambiguity remains unresolved and therefore mysterious.

Metamystery

They are asking questions, working something out through movement. (A45)

For some audience members, this meeting between the ambiguous nature of the work's content and the experience of coming up against the limitations of their understanding folded together into a state of what we might call “metamystery.” Inasmuch as the work engaged with mystery not only in the “theme” of the work, but also in the wider context of choreography itself, conceived by Chimutengwende as a process of creating and solving mysteries, some audience members engaged not only in the work's thematic “about-ness,” that is, in what it seemed to represent, but also in what it was doing in that wider context of understanding and intervening in the field of choreography.

One audience member commented, “Movement is both a medium for that search and the thing they are making meaning of” (A141). We might say that this person engaged at a metamysterious level in their observation that the movement, as a form of perception, was both the method and the object of the search for meaning. This is a very accurate description of what Chimutengwende and McMann were busy with in the “Detecting Score” choreographic section, where they were using improvised movement in a process of “detection,” of open-ended “finding out.” The fact that the audience member was able to perceive this, shows us that even when there is no fixed meaning to be “found” in a work, the audience and dancer can come together in meaningful ways through an

embrace of mystery as a practice; a way of paying attention in non-linguistic, nonlinear ways.

Extrapolating Significance

It looked like the representations of social relationships in a capitalist world. (A172)

The piece *struck me* to be about being stuck in a transitory space as a human between the mess we find ourselves in (midpandemic) and a new way of being/living. How are we to live now? (A116, emphasis added).

Occasionally, the audience's description of what happened spilled out into broader speculations on the work's resonance in the context and time of the performance, or within their own lives and interests. Again, the "about-ness" of the work—the sense of meaning that the work produced—became not something that the work contained, preceding the live instance of performance, but rather an effect of the work being refracted through people's personal experiences and areas of interest/ inquiry during the live, relational encounter itself.

The person writing "the piece struck me" is recalling an impression that the piece made on them live in performance. In a sense, the liveness of the performance—the audience's direct, in-person encounter with the work—was not limited to the moment of the event itself. The liveness, and the impressions which that liveness created, were carried over in the audience's memory.

Memorable Moments

They grinned manically at the audience and offered their hands in some open gift. (A145)

While there was some variety in the exact moments people picked out as the moment they remembered, one moment, in particular, stood out as by far the most commented on. This was the moment 37 min into the 54-min performance, when Chimutengwende and McMann came together in the center of the stage, holding a manic-looking smile for a long period of time and reaching their open, out-stretched hands toward the audience in a kind of fanned-out flower shape, which they moved through the space as they slowly walked backward. This is the segment called "Unison" (see Figure 2A). We might speculate that this material jumped out in people's attention due to its contrast to anything else in the piece: it combined a strong facial expression, sustained for an unusually long amount of time; it was the first and only moment of unison in the work, Chimutengwende and McMann were otherwise always doing different things; it happened only once, whereas the other material was repeated several times; and it was a very direct, almost confrontational, address to the audience, whereas, for most of the work, eye contact with the audience was fleeting or absent altogether.

Another often-recalled moment was the section which, in the choreographic process, was called "Shapes" (see Figure 2B). This occurred 28 min into the performance—just over halfway through—and involved Chimutengwende and McMann staying close together and on the spot for a long period of time as the light slowly changed, and they each performed repetitive, absurd physical shapes/ transformations: "The moment when the lights went a very deep green stood out to me, while the female performer

Figure 2

Two Choreographic Sections of Detective Work



Note. (A) Still image of "Unison" segment. (B) Still image of "Shapes" segment. See the online article for the color version of this figure.

convulsed and the male moved gracefully" (A36). Along with the smiling section, this was the only material that stayed in one spot for any prolonged length of time. That this moment stood out also connects to another comment that was made repeatedly, that Chimutengwende and McMann rarely connected or came together: "They rarely acknowledge each other. Never touch" (A83); "They were on their own track but interconnected" (A111). Both the section "Shapes" and "Unison," therefore, stood out as an exception to this.

And lastly, people often mentioned the moments where the performers spoke or made vocalizations, "Bleurgghhhh" to the audience and then an intense look' (A39). These moments were often sudden, the text humorous/ironic/absurd, and they were sparse in comparison to most of the material of the piece, which was purely movement-based. Taken together, these moments speak both to the nature of Chimutengwende's choreographic choices and to what might make something memorable in a live performance. Choreographically, Chimutengwende worked with building up and then breaking expectation: establishing a choreographic ground rooted in movement, and then suddenly bursting into text over halfway through the work, for example. These standout moments, moments of exception, were also the moments that most captured, and in a sense were captured by, the audience's attention. The moments that were relatively still, which directly faced/ addressed

the audience, and which were sustained for an unusually, perhaps even uncomfortably, long amount of time, were the ones that “stuck” in people’s memories and which they were most able to synthesize and reproduce in language.

Discussion—Qualitative Analysis

Reading the diverse array of responses to *Detective Work*, we can see how the mystery was at work not only in its creation and performance but also in its reception. Audiences grappled, questioned, speculated, and invented their way through the performances, engaging in the imaginative work of choreography as active participants. The spectators’ comments highlight that ambiguity could be experienced both positively and negatively, suggesting a complex relationship between understanding and engagement that does not necessarily require a resolution to be enjoyed.

Memorable moments in the choreography were characterized by their uniqueness and by distinct choreographic features such as the dancers moving in synchrony (Vicary et al., 2017), or dancers making direct eye contact with the audience (Hietanen, 2018), highlighting the importance of social interactions between performers (synchrony) or between performers and the audience (breaking the fourth wall) for engagement. Furthermore, these findings align with existing research reporting a positive relationship between engagement and memory for narrative stimuli like film: better memory for key events in a story is accompanied by increased synchronized brain activity among viewers (Hasson et al., 2008; Song et al., 2021).

Finally, it is important to note that not all participants who completed the survey completed the open-ended questions (33 participants). Arguably, it is the most engaged (or disengaged) spectators who felt compelled to expand and elaborate on their experience in greater detail. It is thus important to see whether engagement and understanding are similarly unrelated when looking at the rating scales.

Quantitative Results

After excluding participants with missing data, data from 108 participants were considered for further analysis. The postperformance survey data were first inspected for skewness and kurtosis (Groeneveld & Meeden, 1984). All 28 items showed skewness $< \pm 1$ (range = -0.82 to 0.52) and kurtosis $< \pm 3.1$ (range = 2.47 – 3.02), and none were excluded from further analysis. Descriptive statistics and correlation matrix between all 28 postperformance questionnaire items are reported in Supplemental Materials S3 and S4 in the online supplemental materials.

PCA

Before computing the PCA, the data were checked with Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy (Kaiser, 1974) and Bartlett’s test for sphericity (Tobias & Carlson, 1969), using “psych” package in R (Revelle, 2013). The KMO measure of sampling adequacy indicated that the data were suitable for factor analysis, with values ranging from 0.71 to 0.96 ($M = 0.91$; see Supplemental Material S2 in the online supplemental materials for full KMO measures for each item). Bartlett’s test of sphericity also indicated that the data were suitable for PCA, $\chi^2(27) = 77.119$, $p < .001$.

The correlation-based PCA was performed on 28 postperformance questionnaire items, followed by a rotation of the matrix

Table 3
Eigenvalues and Variance Explained in Percentage

Principal component	Eigenvalue	Variance explained (%)	Cumulative variance explained (%)
PC1	12.1839322	43.5140434	43.51404
PC2	2.0690861	7.3895934	50.90364
PC3	1.5458974	5.5210621	56.42470
PC4	1.2235086	4.3696735	60.79437
PC5	1.1737538	4.1919778	64.98635

acquired. The analysis found five components above the eigenvalue of 1 (see Table 3).

The first component, Principal Component 1 (PC1), with the eigenvalue of 12.18, was found to explain 43.5% of the variance in the data. The second component, PC2, with the eigenvalue of 2.07, explained 7.39% of the variance in the data. Together, Components 1 and 2 accounted for 50.90% of the variance in the data. The summary of the five principal components can be found in Table 4, representing component loadings for individual items.

PC1 was best explained by the items “The performance moved me” and “I was absorbed in the performance,” followed by items “I feel like I could relate to the performance,” “To what extent did you feel a sense of belonging or connectedness with the performers?” and “To what extent did you inhabit the world of the performers, lose track of time and forget about everything else?” PC2 showed the highest positive correlation with the item “The performance confused me,” followed by “At times I felt like time stood still,” “How much were you provoked or challenged by the performance?,” and negative correlation with the item “To what extent do you feel that you understood the performance.” The third principal component (PC3) was best explained by the item “I feel like I experienced the same emotions as the other spectators while watching the performance” and showed negative loading with the item “To what extent did the performance cause you to reflect on your own opinions or beliefs?” The fourth principal component (PC4) was best explained with negative loading from item “I noticed every moment of time passing” and the fifth principal component (PC5) was best explained by item “At times I felt time stood still,” also with a negative loading. As the variance of PC3 was explained mostly by two items, and that of PC4 and PC5 were only captured by a single item each that already overlapped with PC2, they were excluded from further analysis. For PC1, five questionnaire items that showed maximum loadings and showed a ratio above 1.5 when compared to the loading of PC2 were selected (Table 4, A2, A3, A6, B13, B1), and these items were interpreted as “engagement” component. For PC2, four questionnaire items with maximum variance loadings which showed a ratio higher than 1.5 to the loading of PC1 were selected (Table 4, A7, A10, B3, B5), and these items were interpreted as “confusion.” The reliability of the first and second components was assessed with standardized Cronbach’s α to ensure the reliability estimate will be independent of the variances driven from the mixture of different scales. The internal consistency of the chosen items in the first component was in the range of “excellent” ($\alpha = .91$), whereas the second component had much lower, but still acceptable internal consistency ($\alpha = .51$) based on conventional guidelines (Cronbach, 1951). Thus, specified items were averaged into Component 1, engagement, and Component 2, confusion for

Table 4
Variable Loadings of Principal Components (PC) 1–5

Item	PC1	PC2	PC3	PC4	PC5
A1	0.23588522	-0.167776743	0.137832816	-0.10583526	0.08510545
A2	0.24516983	-0.109529369	0.182807863	0.01426413	0.06639608
A3	0.24048220	-0.055134033	0.018824194	-0.17052872	0.11896390
A4	0.22651311	-0.111400105	0.044152819	-0.17017447	0.08119179
A5	0.22666231	-0.138910211	0.095030682	-0.04684228	0.23136045
A6	0.23743886	-0.141819010	-0.022697478	-0.01320968	-0.11947224
A7	-0.06868133	0.449386558	0.236670553	0.04070722	0.28213011
A8	0.16248354	0.037742423	0.207600068	0.23642681	0.19673272
A9	-0.13013559	0.127576827	-0.195620261	-0.28141009	-0.19872989
A10	0.05656561	0.346315684	-0.077822780	-0.15262358	-0.42441653
A11	-0.05829831	0.164498146	-0.029074236	-0.65056015	0.31223577
A12	0.15071886	0.235650248	-0.067268612	-0.21582727	0.06405425
A13	0.18731272	0.018937249	-0.010033464	-0.02597976	-0.17345973
A14	0.08543259	0.255332259	0.508381825	-0.06959080	-0.26337849
B1	0.23345383	-0.036540552	-0.011868941	0.14180488	-0.15171796
B2	0.20176443	0.055295301	-0.083098001	0.11835674	0.22556779
B3	0.17280391	0.284389430	-0.052993725	0.16369702	0.27086688
B4	0.13370369	0.175789537	-0.490253789	0.19341028	0.11600521
B5	0.18878409	-0.288002060	-0.206039384	-0.03648486	-0.17022638
B6	0.19333636	-0.023397593	-0.032595756	-0.29163295	0.02749054
B7	0.23117356	-0.093353696	0.118988271	0.02522852	-0.13261630
B8	0.22636776	0.090763559	-0.003900592	-0.10817193	-0.15516505
B9	0.23308859	-0.046658061	0.007610016	-0.11648970	0.07697161
B10	0.15104354	0.227635615	-0.142779066	0.03202395	-0.30780184
B11	0.21570182	0.107304108	-0.216609372	-0.09335160	0.02676512
B12	0.13944448	0.275007894	0.259195294	0.15845646	-0.08519664
B13	0.23360521	-0.006540974	0.054817110	0.04905963	-0.09308384
B14	0.17107642	0.243864555	-0.287982859	0.21202435	0.10677443

Note. Bold items were included into the component, based on a ratio of >1.5 compared to the loadings on other components.

further analysis. Item B5, which was negatively correlated, was reversed by subtracting each value from 8 before they were averaged as Component 2.

Comparing Live Performance and Performance Screening

The two components were compared between the different conditions of the audiences' experience—between the live performance versus the screening (see Figure 3). Welch two sample T test was adopted to handle the difference in sample sizes. The analysis revealed that engagement differed significantly between live performance and screening, $t(103.16) = 3.64$, $p < .001$, 95% confidence interval (CI) [0.38, 1.29]. Spectators in the live performance were more engaged ($M = 4.67$, $SD = 1.39$) than spectators in the screening ($M = 3.83$, $SD = 1.48$). Confusion significantly differed between spectators of the live show and the performance screening, $t(134.02) = 2.56$, $p < .01$, 95% CI [-0.64, -0.08], but showed an effect in the opposite direction. Spectators of the screening reported more confusion ($M = 4.42$, $SD = 0.82$) than spectators of the live performance ($M = 4.06$, $SD = 1.02$).

We computed Pearson's correlation between the two components identified above with participatory and observational dance experience of the Gold-DSI (Bonferroni—corrected). We observed significant positive relationships between engagement and both dance participation ($r = .28$, $p = .04$), and observation ($r = .30$, $p = .017$). Confusion correlated negatively with observational dance experience ($r = -.24$, $p = .013$) but not significantly with participatory dance experience ($r = -.19$, $p = .058$). Dance participation and observation

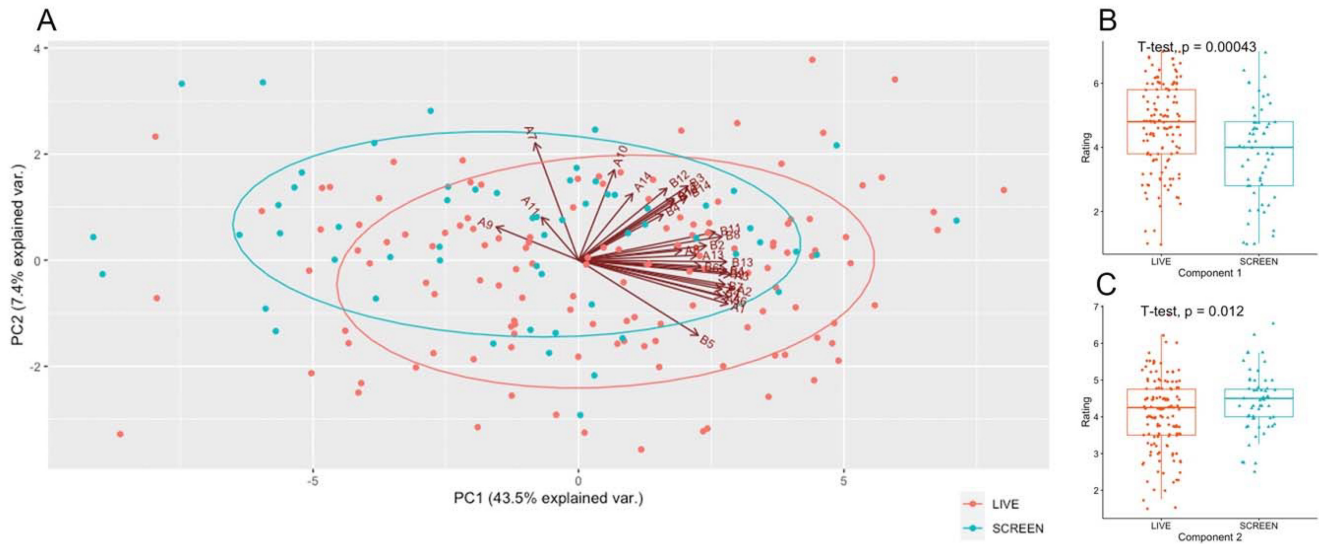
were strongly and significantly correlated in our sample ($r = .68$, $p < .0001$).

Further inspection of the Gold-DSI revealed significant differences in dance expertise between the audience attending the live performance and the audience attending the performance screening. Welch two-sample t tests revealed that both dance participation, $t(93) = 6.78$, $p < .0001$, 95% CI [0.80, 1.46], and dance observation, $t(91.73) = 7.61$, $p < .0001$, 95% CI [1.52, 2.60], significantly differed between live show and screening. Spectators in the live performance had more participatory dance experience ($M = 5.37$, $SD = 1.18$) than the spectators in the screening ($M = 4.24$, $SD = 0.52$) and the live audience had more experience in dance observation ($M = 5.20$, $SD = 1.37$) than the participants in the screening ($M = 3.14$, $SD = 1.39$).

Dance expertise differed significantly between live and screening audiences and significantly correlated with engagement and confusion. Therefore, we computed linear models to inspect the influence of both participatory and observational dance experience on engagement and dance observational experience on confusion.

To test whether engagement differed between live performance and screening while accounting for the individual differences in dance participation experience, we fitted a linear model predicting the first component, engagement, with the group effect (liveness) and dance participation (see Figure 4). Including dance participation generated an overall model explaining a statistically significant but weak amount of variance, $R^2 = .08$, $F(2, 105) = 4.72$, $p = .011$, adjusted $R^2 = .07$, and produced a marginally significant effect of dance participation, $b = 0.32$, 95% CI [0.04, 0.61], $t(105) = 2.25$,

Figure 3
PCs Live Versus Screening



Note. (A) Representation of bidimensional principal components. (B) Component 1 mean comparison between participants in live performance versus recorded screening. (C) Component 2 mean comparison between participants in live performance versus screening, not corrected for dance experience. PC = Principal Component; var. = variance. See the online article for the color version of this figure.

$p = .0261$; $\beta = .24$, 95% CI [0.03, 0.46], however eliminated the main effect of liveness on engagement, $b = -0.22$, 95% CI [-1.00, 4.15], $t(105) = -0.68$, $p = .499$; $\beta = -.15$, 95% CI [-0.58, 0.29]. Similar results were obtained for dance observation: including observational dance experience eliminated the main effect of liveness, $b = -0.07$, 95% CI [-0.76, 0.62], $t(105) = -0.2$, $p = .843$; $\beta = -.05$, 95% CI [-0.51, 0.42]. Instead, observational dance experience emerged as the only significant predictor of engagement, $b = 0.25$, 95% CI [0.05, 0.45], $t(105) = 2.51$, $p = .014$; $\beta = .29$, 95% CI [0.06, 0.52], in the overall statistically significant yet weak model, $R^2 = .09$, $F(2, 105) = 5.35$, $p = .006$, adjusted $R^2 = .08$.

The previously found effect of liveness on confusion equally disappeared when observational dance experience was added as a predictor. When we fitted a linear model predicting confusion with group (live vs. screening) and dance observation, though the overall model was statistically significant, the variance explained was very small, $R^2 = .07$, $F(2, 105) = 4.11$, $p = .019$, adjusted $R^2 = .06$. Moreover, the findings indicated that there was no significant main effect of group between the audience in the live and the screening on self-reported confusion when dance observation was accounted for, $b = 0.29$, 95% CI [-0.19, 0.77], $t(105) = 1.20$, $p = .234$; $\beta = .28$, 95% CI [-0.19, 0.75]. Observational dance experience did not emerge as significant predictors of confusion, $b = -0.10$, 95% CI [-0.24, 0.04], $t(105) = -1.38$, $p = .170$; $\beta = -.16$, 95% CI [-0.39, 0.07].

Comparing Participants With or Without Wearable Sensors

The comparison of the two components between participants wearing EEG or not shows similar findings to that of live versus screening (see Figure 5). Engagement was found to be significantly different between the two groups of participants, $t(186.6) = -3.72$, $p < .001$, 95% CI [-1.16, -0.36]. Participants wearing EEG on

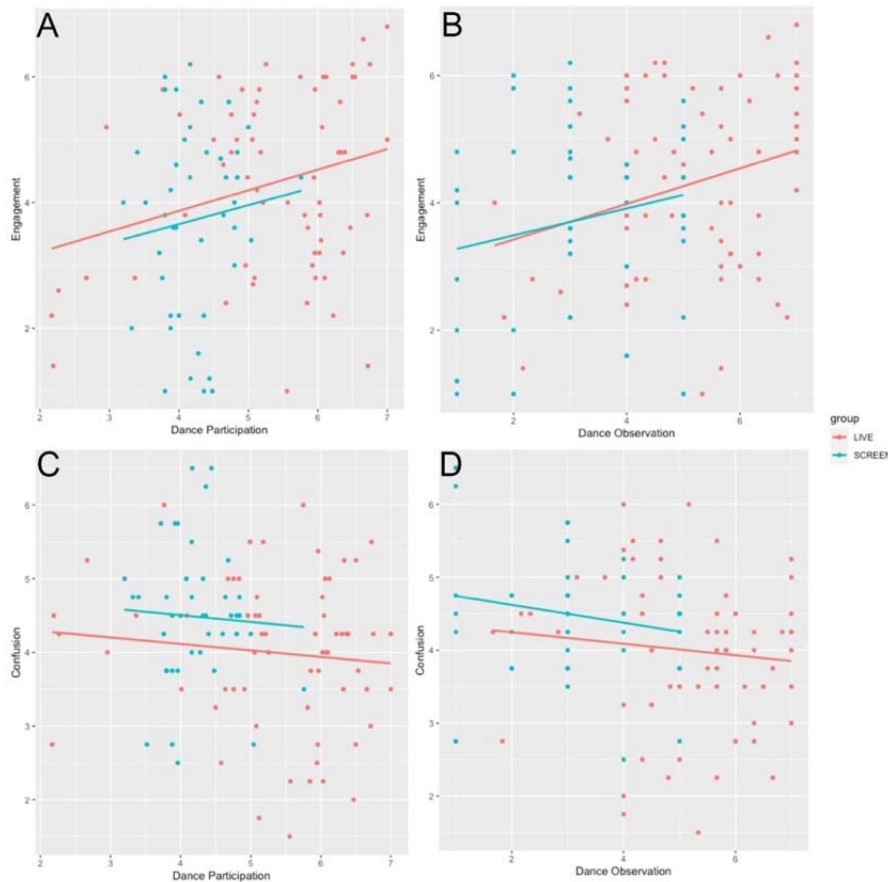
average reported significantly lower engagement with the performance ($M = 4.07$, $SD = 1.5$) than participants without wearing EEG ($M = 4.83$, $SD = 1.32$). However, this effect on engagement from experience type vanished when dance participation was taken into account. Similarly, the effect of wearing EEG vanished when dance observation was taken into account, $b = 0.24$, 95% CI [-0.45, 0.92], $t(105) = 0.69$, $p = .492$; $\beta = .16$, 95% CI [-0.30, 0.62], while dance observation was a significant predictor of engagement, $b = 0.25$, 95% CI [0.09, 0.42], $t(105) = 3.09$, $p = .003$; $\beta = .29$, 95% CI [0.10, 0.48]. The overall model explained a significant but small amount of variance in engagement, $R^2 = .10$, $F(2, 105) = 5.59$, $p = .005$, adjusted $R^2 = .08$.

Wearing mobile EEG did not affect perceived confusion, $t(178.02) = 0.89$, $p = .37$, 95% CI [-1.15, 0.41], between the group wearing EEG ($M = 4.23$, $SD = 0.97$) and the group not wearing EEG devices ($M = 4.10$, $SD = 0.99$).

Mood Shifts From SAM—Happiness and Excitement

To inspect participants' mood changes in happiness and excitement, we conducted two separate mixed analyses of variance looking at two between-group factors of physical liveness (live vs. screening) and type of engagement (wearing EEG or not), and one within factor of different timepoints: before and after attending to the performance of *Detective Work*. We found no main effect of performance, liveness, nor engagement type. However, there was a weak but significant interaction effect between the performance and engagement type, $F(1, 148) = 5.41$, $p = .02$, $\eta^2 = .009$. People wearing EEG reported higher happiness before and a decrease in happiness after the performance, whereas people without EEG reported an increase in happiness after the performance. However, the post hoc Tukey honest significant difference test did not reveal significant comparison after p -value correction. For

Figure 4
 Visualization of Linear Relationship Between the Two Components (PCA) and Two Factors (Gold-DSI) Between Groups (Live vs. Screening)



Note. (A) Engagement and dance participation. (B) Engagement and dance observation. (C) Confusion and dance participation. (D) Confusion and dance observation. PCA = principal component analysis; Gold-DSI = Goldsmiths Dance Sophistication Index. See the online article for the color version of this figure.

excitement, we found that participants reported that they felt slightly more calm after the performance, $F(1, 148) = 6.49$, $p = .01$, $\eta^2 = .01$, and in general, people not wearing EEG reported more excitement, $F(1, 148) = 5.2$, $p = .02$, $\eta^2 = .02$.

Discussion—Quantitative Analysis

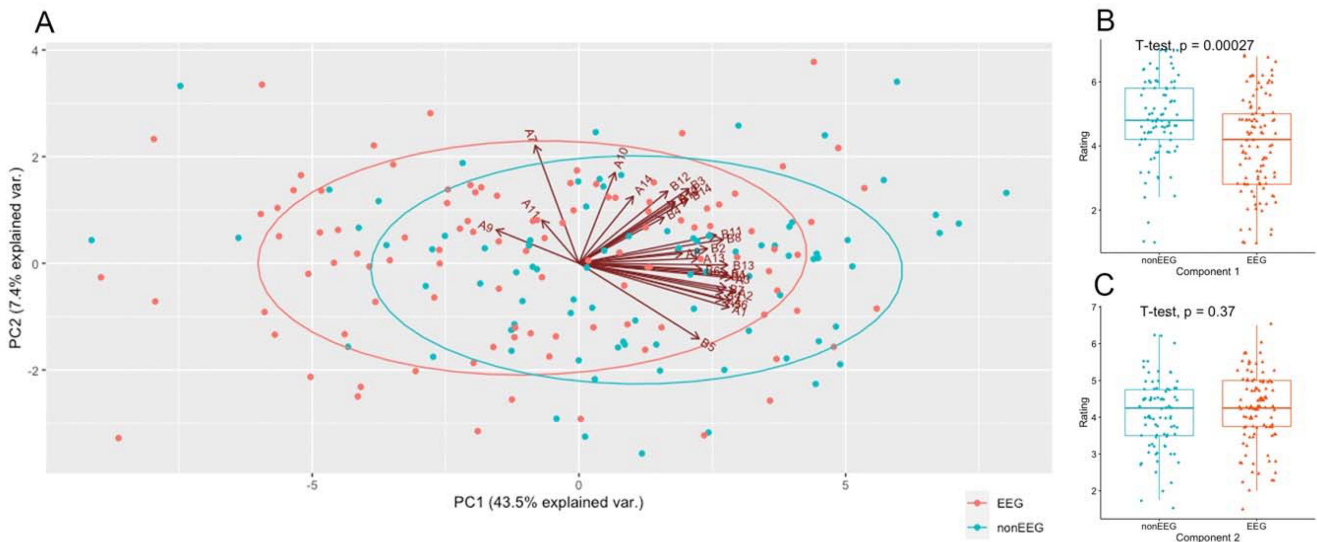
In the quantitative analysis, we explored the immediate audience response to the live performance and screening of *Detective Work* and found two meaningful dimensions: one how immersed an audience member feels, and the other the confusion and challenge one experiences to understand what the performance “is about.” Engagement with *Detective Work* was best explained by spectators’ dance experience, regardless of the context in which it was experienced. The more participatory and observational dance experience people had, the more engaged they were. Confusion on *Detective Work* was explained neither by one’s dance experience nor performance context such as liveness or experience type. This suggests that the audience were confronted with confusion during *Detective*

Work, regardless of whether the performers shared the same space and time with them, in what way they were participating, or how much dance experience one had in the past. Hence, in both qualitative and quantitative analyses, confusion emerges as a key component of the aesthetic appreciation of *Detective Work*. Additionally, the experience of wearing mobile sensors did significantly affect people’s mood, captured in the reduction of overall excitement and happiness after the show only for participants wearing mobile EEG.

General Discussion and Conclusion

Aligned with the choreographic intentions, findings from both qualitative and quantitative analysis converge onto two main components of the audience’s aesthetic experience of *Detective Work*: engagement and confusion. The fact that the two distinct dimensions of aesthetic experience are orthogonal to one another, and not negatively correlated, suggests that understanding is neither a necessary nor sufficient condition for engagement. Such a finding poses a

Figure 5
PCs EEG Versus Non-EEG



Note. (A) Representation of bidimensional principal components. (B) Component 1 mean comparison between participants wearing EEG versus not wearing EEG. (C) Component 2 mean comparison between participants wearing EEG versus those not wearing EEG. PC2 = Principal Component 2; var. = variance; PC1 = Principal Component 1; EEG = electroencephalogram. See the online article for the color version of this figure.

challenge for theoretical accounts that link aesthetic pleasure to resolution of uncertainty (Van de Cruys et al., 2024)—both qualitative and quantitative findings suggest that the very act of searching for meaning is a form of engagement and does not require this search to be fulfilled with insight.

The audience's experience of confusion is mirrored in the artistic focus on mystery in *Detective Work* which adopts two common contemporary dance practices: firstly, usage of improvisational “scores”—i.e., inviting performers to not merely reproduce predefined movements but to generate movement material in the moment; and the concept of “nonrepresentational poetics of choreography” (Irvine, 2015), thus providing the audience a space to feel confused in the out-of-the-ordinary context of a performance. Here, mystery is not something to be solved, but something to be explored, even produced together between the artists and the audience. In this view, engagement with the artwork does not result from the resolution of ambiguity via insight, or an “aesthetic aha” (Muth & Carbon, 2013). Instead, engagement is held by upholding uncertainty and ambiguity over the entire course of the performance (Burrows, 2010). The audiences are engaged in an active search for meaning over the actual discovery of meaning. In other words, unresolved confusion does not automatically result in disengagement, contrary to the claims of theories of aesthetic experience aligned to the predictive coding framework, in which the minimization of prediction error is an inherently rewarding experience (Christensen et al., 2023; Pelowski et al., 2017; Silvia, 2013; Van de Cruys & Wagemans, 2011).

Second, we inspected whether the context of the work had any impact on people's appreciation of the choreography. Three dimensions were explored: the presentation format (live or screened), the type of audience experience (with or without wearing mobile EEG), and prior dance experience. We found that the effect of physical liveness or wearing a mobile EEG on engagement vanished when factoring

in one's previous dance experience. Dance expertise was the best predictor of engagement. Importantly, prior experience with dance did not necessarily result in greater understanding or less confusion. Rather, dance experience allowed audience members to be better prepared for engaging with the ambiguity and mystery inherent to *Detective Work*. This aligns with previous research in the visual arts where people prefer representational over nonrepresentational art (Landau et al., 2006; Leder et al., 2012; Schepman et al., 2015; Sidhu et al., 2018; Vessel & Rubin, 2010), but that preference is reduced in art experts (Darda & Cross, 2022). Thus, our findings are relevant to understanding people's engagement with other contemporary art forms that encompass ambiguity and uncertainty.

Third, we show that in a between-subject design, individual differences can outweigh the influence of physical liveness (live vs. recorded), when social liveness is controlled for; both live and screened audiences experienced *Detective Work* together, not alone. Our study therefore shows that it is important for future studies to control whether they manipulate physical or social liveness, or a combination of both. Without the opportunity to make a direct comparison between different presentation formats, spectators of the live and the screened versions of *Detective Work* engaged with what was happening on stage or on the screen rather than the context of their experience. Alternatively, social liveness may simply be more important for engagement than physical liveness: watching a dance performance together with others may matter more than watching a dance performance in the theatre.

While concurrent neurophysiological data collection is arguably less distracting than providing continuous ratings during a performance (Millman et al., 2022), the experience of wearing mobile EEG sensors during the performance did impact the audience's mood significantly. Before the performance began, the audience with mobile EEG reported higher happiness compared to the

audience without wearable sensors, which may be due to the novelty and fascination facilitated by interacting with the researchers or modern wearable technology directly. However, such valence and excitement shown prior to the event decreased significantly after attending the 1-hr dance performance, which may be driven by the discomfort and exhaustion of wearing EEG caps.

Finally, we show that adopting a mixed methods approach provides convergent levels of evidence for understanding aesthetic experience. The qualitative analysis allowed themes to arise from the audience's immediate response—modes and strategies of engaging, interpreting, and reflecting on *Detective Work*, in its depth and idiosyncrasy, to be considered at the junction with what was explored from the quantitative data. Having the dramaturg of the artwork analyze the qualitative survey also allowed us to consider how the artistic context, creative process, and choreographic intentions met the audience's expectations and focus.

Limitations and Future Directions

There are some limitations to our study. For example, it is possible that the effect of physical liveness was reduced due to our in-between subject design. One possible alternative to address this is to adopt a within-subject design, where a group of participants would experience both live and recorded versions of the performance. However, in a within-subject design participants are more likely to be influenced by social desirability effects and people would experience the same artwork twice.

Another limitation is that our findings and interpretations are based on one particular dance choreography. It is likely that the factorial structure of live engagement with the performing arts will differ between the performing arts genres (e.g., dance, music, or theatre) and between specific artworks. However, to the extent that underspecified or multiple possible meanings, ambiguity, and mystery are a common feature of the visual and the performing arts, our distinction between pleasure from experiencing and pleasure from understanding remains relevant, particularly in an immersive, live performance or gallery context. More research is needed to see how the findings of this study will generalize to a different choreography, theatre play, or music concert. Moreover, it would be interesting to systematically manipulate the degree of ambiguity in a given artwork and to see how changes in ambiguity impact the dissociation between confusion and engagement that we observed for *Detective Work*.

Finally, it was a deliberate choice for the qualitative thematic analysis to be conducted by the dramaturg of *Detective Work* to assess in what way audience responses reflect the actual artistic intentions behind the work and in keeping with a coproductive approach to this research, in which artists participate in the process of scientific investigation. For future research, it would be interesting to include thematic analyses conducted by other dance specialists who were not directly involved in the creation process.

Conclusion

Our findings show that aesthetic cognitivism and specifically the predictive coding accounts of aesthetic experience need to be tested in ecologically valid experimental settings, in our study live contemporary performing dance. In conclusion, we argue that a positive relationship between understanding and aesthetic pleasure may not necessarily apply to the actual experience

of the performing arts in the theatre. Rather, art appreciation in the real world might be better explained as pleasure from experiencing than pleasure from understanding.

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