The effects of single vs multiple perspectives in film on children's open-mindedness

Francesca Carbone (a), Angela Nyhout (a), Stacie Friend (b), Murray Smith (c), Heather J. Ferguson (a)

a School of Psychology, University of Kent, Canterbury CT2 7NP, United Kingdom

b School of Philosophy, Psychology and Language Sciences, University of Edinburgh, Scotland, EH8 9JX, United Kingdom

c School of Arts and Architecture, Jarman Building, University of Kent, Canterbury CT2 7UG, United Kingdom

Corresponding author

f.carbone@kent.ac.uk (F. Carbone)

DOI: 10.1016/j.cogdev.2026.101781

Abstract

Aesthetic Cognitivism claims that art can foster open-mindedness-an important epistemic virtue and educational goal. However, empirical studies testing this claim are rare, especially with film, a medium popular among children. The current study examined whether narrative films depicting multiple perspectives enhance open-mindedness in children aged 8-12 years old (N = 150), a period marked by advances in narrative understanding and perspective-taking. We compared three conditions: a multiple-perspective clip from Hoodwinked, a single-perspective version of the same film, and a no-film control. Open-mindedness was assessed via four established behavioural measures: creativity, imaginability, openness to new evidence, and cognitive flexibility. Three physiological indices (eye movement, heart rate, electrodermal activity) were also measured during viewing. None of the behavioural measures showed improvement in the film conditions versus no-film, and multiple perspectives did not yield benefits over a single perspective. However, electrodermal activity was higher in the multiple-perspective condition than the single perspective condition, suggesting greater arousal, though without corresponding behavioural gains. Unexpectedly, creativity scores were lower in both film conditions relative to the control, indicating a potential short-term depleting effect of watching the film on creativity. These results do not support the claim that film, or the presentation of multiple perspectives, promotes open-mindedness in children.

Keywords

Open-mindedness; Perspectives; Film; Children

Funding and open data

This study was supported by a Templeton Religion Trust Project Grant (TRT-2021-10476), grant to SF, AN, MS and HF. The pre-registrations, datasets and scripts supporting this article are available on the Open Science Framework (pre-registration: https://osf.io/3u8ny; datasets and scripts: https://osf.io/szetn/).

1. Introduction

Art has long held a central place in educational theory, not merely as a medium for aesthetic appreciation but as a catalyst for intellectual and emotional development (Greene, 2000; Winner and Cooper, 2000). Winner and Cooper (2000), for instance, highlight the potential role of aesthetic experience in enhancing children's cognitive skills, with applications across academic domains such as critical, divergent, and independent thinking, as well as problem solving and problem finding. This view aligns with the philosophical claim of Aesthetic Cognitivism, which maintains that art can broaden individuals' open-mindedness by reframing and reshaping their perception and experience of the world (Lopes, 2005; Baumberger, 2013; Smith, 2017). Open-mindedness is a complex construct that has been conceptualised in multiple ways (for a detailed discussion, see Baehr, 2011). One proposed definition describes it as the capacity to transcend one's own limited perspective in order to consider alternative possibilities (adapted from Baehr, 2011; Carbone et al., 2026). On this view, open-mindedness is considered a multifaceted construct, encompassing various abilities, including crea tivity, imaginability, openness to new evidence, and cognitive flexibility-each of which has been theoretically and empirically linked to the capacity to revise beliefs and engage with novel perspectives (Baron, 1993; Kaufman and Beghetto, 2009; Stanovich and West, 1997; Carbone et al., 2026). Understanding whether and how artistic experiences can cultivate different facets of open-mindedness represents an important question for educational theory and empirical research. The present work addresses this question by exam ining whether exposure to narrative films that vary in the number of perspectives they represent can promote changes across multiple dimensions of open-mindedness in children.

Empirical research has primarily investigated the cognitive effects of narratives in the context of reading. Meta-analyses suggest that

exposure to fictional narratives, compared with no reading or reading informational texts, is associated with marginal im provements in socio-cognitive abilities, including affective empathy and mentalising (Dodell-Feder and Tamir, 2018; Mumper and Gerrig, 2017; Wimmer et al., 2024). However, these effects are generally small in magnitude (Wimmer et al., 2024), and recent studies have also reported null findings (Wimmer et al., 2021; Wimmer et al., 2025). A related but distinct line of research has examined differences between literary fiction and other genres, particularly popular fiction and non-fiction. Kidd and Castano (2013) initially reported that reading literary fiction temporarily enhances theory of mind; however, this finding has been widely debated, with several unsuccessful direct replications (e.g., Panero et al., 2016; Samur et al., 2018) and conceptual replications (subsequent studies testing the same hypothesis with different methods) also failing to observe comparable effects (e.g., Lenhart & Richter, 2025; Schwerin et al., 2025). In contrast to extensive work examining the effects of reading fiction on socio-cognitive abilities, relatively few studies have examined associations between reading literature and facets of open-mindedness (Wimmer et al., 2022). In one study, Wimmer et al. (2022) compared fiction and nonfiction reading effects on creativity, imaginability, openness to new evidence, and cognitive complexity in university students, but found no evidence of an effect of fiction exposure. However, this work focused exclusively on adults and did not manipulate specific narrative features that may be critical in shaping these outcomes.

In comparison to adults, children may be particularly receptive to the cognitive benefits of certain artistic features, suggesting that developmental factors could moderate these effects (Eisner, 2003). Consistent with this idea, educational settings often use stories and structured reading interventions to explore children’s understanding of characters’ perspectives. For instance, Hodges et al. (2018) tested a

reading intervention designed to help children aged 8-9 grasp conflicting perspectives between two characters. Instruction centred on perspective-taking led to moderate improvements in literature comprehension, especially for questions requiring under standing of character viewpoints and plot. Furthermore, children showed evidence of transferring these perspective-taking skills to texts beyond the intervention material. These findings support the notion that reading narratives with multiple character perspectives can foster children's perspective-taking abilities and enhance their cognitive skills for processing complex stories (Hodges et al., 2018).

Far less attention has been devoted to the cognitive effects of watching film-an especially prevalent and accessible artistic medium for children. Existing research has primarily examined associations between exposure to screen narratives (including film and tele vision) and socio-cognitive outcomes such as theory of mind, creativity, imagination, and cognitive flexibility. In the domain of social cognition, correlational findings remain mixed. For instance, Mar et al. (2010) reported that exposure to films, but not television series, was positively associated with children's theory of mind, suggesting potential medium-specific effects. In contrast, more recent work has found no significant associations between narrative exposure and theory of mind (Lenhart & Richter, 2024a), and experimental evidence likewise indicates no effects on social cognition of viewing television series vs documentaries (Lenhart & Richter, 2024b). Interestingly, a recent study found that stronger theory of mind abilities predicted greater moral understanding of films, but not retrospective reflection on the viewing experience, suggesting that socio-cognitive skills may facilitate the online processing of narrative meaning while rendering subsequent reflection less necessary (Jackowski et al., 2025). Beyond social cognition, experi mental studies have also examined cognitive outcomes such as creativity and cognitive flexibility in response to

fantastical screen content. Some studies suggest potential benefits: exposure to magical or science fiction films has been linked to enhanced creativity, imagination, and aspects of scientific reasoning (Subbotsky et al., 2010; Lin et al., 2013; Black and Barnes, 2021). However, other research has reported impairments in cognitive control and flexibility following exposure to fantastical and fast-paced television, particularly in younger children (Lillard et al., 2015; Kes¸s¸afo˘glu et al., 2024; Hinten et al., 2025).

Overall, these mixed findings appear to depend on the nature of the media consumed, with fast-paced television content associated with less favourable cognitive outcomes, whereas more structured narrative film may show neutral or positive associations. Moreover, most of these studies did not examine individual differences like viewers' personality traits or film expertise, which can influence how they engage with film viewing. For instance, openness to experience (i.e., open-mindedness as a personality trait) is linked to imag ination, curiosity, creativity, tolerance for ambiguity, and a preference for complex art (McCrae and Costa, 2008; McCrae, 1987; Chamorro-Premuzic et al., 2009; Silvia, 2006). Likewise, familiarity with cinema seems to influence how viewers interpret and respond to films (Silvia & Berg, 2011).

Films provide a powerful platform for perspective-taking by employing visual and narrative techniques to depict multiple character viewpoints on the same event (e.g., the Rashomon effect; Anderson, 2016), potentially promoting open-mindedness. To date, only one study has empirically examined the impact of multiple perspectives in film on open-mindedness-and solely in adults, with no empirical work yet conducted with children. Carbone et al. (2026) investigated how films portraying single vs multiple perspectives affect several facets of open-mindedness in adults, including creativity, imaginability, openness to new evidence, and cognitive flexibility. Participants viewed a sequence

from Jackie Brown (the money exchange scene) that was presented either from multiple characters' perspectives-as in the original film-or from a single character's perspective, on the same event. Both film conditions were compared with a no-film control group, in which participants did not watch a film clip before completing the open-mindedness assessment. Results showed that those exposed to the film conditions scored higher on cognitive flexibility than those in the control (no-film) group. Neither of the film conditions, independent of whether they presented a single or multiple perspectives, produced any effect for the other open-mindedness measures. Unexpectedly, greater pupil dilation occurred in the single-perspective condition than in the multiple-perspective condition, likely reflecting the higher cognitive effort required to process the money-exchange scene from a single perspective.

1.1. The present study

Our study builds upon Carbone et al. (2026) by investigating whether a film portraying multiple perspectives on an event enhances open-mindedness more than a film presenting a single, dominant perspective, in children aged 8-12 years. The rationale for focusing on multiple perspectives comes from both philosophical and psychological accounts of open-mindedness, which emphasise the epistemic value of considering diverse viewpoints and alternative possibilities (Baehr, 2011; Baron, 1993). Relatedly, artists too have proposed that stories told through multiple perspectives elicit active reflection of the part of the reader or viewer (Brecht, 1964; Silberman, 2021), suggesting that they may foster open-mindedness by encouraging viewers to shift between standpoints and to entertain multiple interpretations of the same situation.

While Carbone et al. (2026) did not find evidence that multiple perspectives in film enhance open-mindedness in adults, the impact of multiple perspectives in film narratives on children remains an open question, motivating the current study. During childhood, heightened

neural plasticity and ongoing brain reorganisation (Kolb & Gibb, 2011) may increase children's responsiveness to envi ronmental inputs, including narrative experiences that expose them to multiple perspectives. Middle childhood (8-12 years), in particular, constitutes a critical period in which cognitive and social abilities relevant to open-mindedness undergo significant development. By this age, children reliably demonstrate second-order theory of mind and can integrate different viewpoints within complex narratives (Goldstein and Winner, 2012; Wellman, 2014). They also show growing competence in counterfactual reasoning-the ability to imagine alternative possibilities and “what-if” scenarios (Beck & Riggs, 2014). Importantly, exposure to narratives presenting multiple perspectives may prime socio-cognitive processes by increasing the salience of alternative viewpoints, thereby facilitating subsequent perspective-taking and reasoning. This is consistent with accounts of short-term activation of men talising processes following narrative engagement (cf. Panero et al., 2016). Such effects may be particularly pronounced in children, whose socio-cognitive systems are still developing and may therefore be more responsive to contextual cues than those of adults. Based on this developmental rationale, we selected a broad middle-childhood range (8-12 years) to capture a developmentally coherent period of rapid socio-cognitive development relevant to open-mindedness and to maximise the generalisability of the findings across this key developmental window. Age was included as a covariate to account for potential developmental variation within the sample.

We also took the opportunity in the present study to address a limitation of Carbone et al. (2026), which used modified versions of the money-exchange scene from Jackie Brown, presented from either a single perspective or multiple perspectives. In that study, the multiple-perspective version provided additional information about the unfolding events relative to the single-perspective version. Consequently,

the two versions differed not only in the number of perspectives presented but also in the amount of information available to construct a coherent representation of the unfolding event. The reduced information available in the single-perspective version may therefore have placed greater demands on narrative comprehension, making it difficult to determine whether any observed effects reflected perspective-taking or differences in the complexity of the stimulus. To address this limitation in the present study, we created two versions of a clip from the child-friendly film Hoodwinked! (2005), a modern retelling of the classic Little Red Riding Hood tale, in which the amount of narrative information was held constant across conditions. The sequence depicts the same event-the grandmother's kidnapping-in both versions. In the single-perspective condition, the event is presented from the wolf's perspective only, whereas in the multiple-perspectives condition, the same event is presented from the perspectives of both Little Red and the wolf. Crucially, each perspective provides sufficient information for the event to be understood independently, without requiring integration across perspectives. Thus, the two versions were largely matched in terms of the narrative information available for comprehension, reducing the possibility that differences in narrative complexity could account for any observed effects.

As in Carbone et al. (2026), we conceptualised open-mindedness as a broad construct (from Baehr, 2011) encompassing various abilities such as creativity, imaginability, openness to new evidence, and cognitive flexibility, and examined how these open-mindedness characteristics relate to a personality trait associated with open-mindedness (openness to experience) and to film expertise. We also measured children's attentional and affective responses (eye movements, heart rate, and electrodermal activity) to assess whether these real-time reactions to the film predicted later effects on open-mindedness. Here, we were motivated by previous research suggesting that attentional and affective responses during media

exposure play a key role in subsequent cognitive and attitudinal outcomes (e.g., Lang et al., 2000; Potter & Bolls, 2012). In particular, physiological arousal and attention allocation are understood to reflect the extent of cognitive resources devoted to encoding and processing media content, which in turn influences memory and later evaluative responses (Bradley et al., 1992; Lang et al., 2000). In line with this, psychophysiological measures (e.g., eye movements, heart rate, and skin conductance) have been widely used as indicators of selective attention and emotional engagement during media exposure and have been shown to predict downstream information processing effects (Potter & Bolls, 2012). This body of evidence suggests that moment-to-moment attentional and affective responses during film viewing may serve as meaningful predictors of later behavioural and attitudinal changes, including open-mindedness.

Consistent with our pre-registration, we predicted that children in the two film conditions would exhibit enhanced performance on the open-mindedness measures (creativity, imaginability, openness to new evidence and cognitive flexibility) compared to children in the no-film control group. In line with the idea that multiple perspectives may prime socio-cognitive processes by increasing the salience of alternative viewpoints and facilitating perspective-taking and reasoning (Hodges et al., 2018), we also expected that open-mindedness scores would be higher for children in the multiple-perspective film condition compared to those in the single-perspective film condition. Similarly, we expected children to show greater online attentional and affective responses (i.e. a higher number of eye movements, greater pupil dilation, electrodermal activity and heart rate) when watching a film embodying multiple perspectives on an event compared to watching a film embodying a single perspective on the same event. Finally, we expected that children with higher film expertise and higher openness to experience would exhibit enhanced

performance on the open mind edness measures and greater attentional and affective responses than those with lower film expertise and openness to experience.

2. Methods

Full ethical approval was obtained prior to data collection from the Research Ethics Committee of the School of Psychology at the University of Kent. All hypotheses, methodological procedures, manipulations and exclusion criteria were pre-registered on the Open Science Framework, https://osf.io/3u8ny. The experiment employed a between-subjects design with three levels (no film, single-perspective or multiple-perspective film conditions).

2.1. Participants

One hundred and fifty-two children, aged 8-12 years old, were recruited through established school networks and the University of Kent developmental participant database to reach a pre-registered target sample size of N = 150. This sample was chosen to match that used by Djikic et al. (2013), who studied effects of reading fiction versus non-fiction on a related concept of cognitive closure, and Carbone et al. (2026), who investigated the effects of perspective and formal complexity in films on adults' open-mindedness. Exclusion criteria comprised a prior diagnosis of autism and lack of fluency in English. In addition, participants were required to complete a set of comprehension questions (see below), which served as an attention check to identify children who did not adequately attend to the film. Participants who answered more than two of the four questions incorrectly were excluded; in the present sample, all participants answered the comprehension questions correctly, and no exclusions were made on this basis. Two children were excluded due to technical problems with recording online measures. The final sample of 150 children [Mage = 118 months (9 years, 10 months), SD = 16 months; 45% were girls, 55% boys] were randomly allocated to one of three conditions, with 50 children per condition: single-perspective film, multiple-perspective film, no film (control). Children received £ 10 for their participation.

2.2. Materials

2.2.1. Film stimuli

Two edited excerpts from the 3D computer-animated film Hoodwinked! (Edwards et al., 2005) - a reimagined version of Little Red Riding Hood produced by Kanbar Entertainment and distributed by The Weinstein Company - were used as audiovisual stimuli, each lasting approximately 34 min. The excerpts were presented to children using SR Research's Experiment Builder software (Version 2.3.1). A schematic illustration of the excerpts for both conditions is shown in Fig. 1.

Both film excerpts depict the narrative sequence surrounding the investigation into who was responsible for an assault on Little Red Riding Hood's grandmother and the theft of her recipe book. The storyline unfolds through character testimonies and differing ac counts of the same events, allowing for the presentation of alternative perspectives on the main event. Although the sequence included elements of uncertainty and perspective variation, it ultimately followed a coherent and structured plot that progressively leads to the resolution of the case. In the single-perspective condition, the events were shown exclusively from the wolf's narrative and visual perspective. In the multiple-perspective condition, the same events were first shown from Little Red Riding Hood's perspective (in which she believes the wolf is guilty), followed by the wolf's conflicting perspective (which provides an alternative account supporting his innocence). Before watching the film excerpts, children were presented with an auditory prologue (identical across conditions) that introduced key characters and the plot context to ensure that the plotline was understandable. As illustrated in Fig. 1, each film excerpt was divided into five segments.

Both conditions began with the same three-minute introductory scene introducing the characters and included a nine-minute scene portraying the events from the wolf's point of view. These scenes served as

the baseline and target segments, respectively, for analysing online measures. In the single-perspective condition, an additional bridging scene was inserted between the baseline and target segments to maintain narrative coherence and provide a smooth transition. This scene did not include any further details relevant to identifying the true perpetrator of the assault and theft. In contrast, the multiple-perspective condition included a scene from Red's point of view (replacing the bridging scene in the single-perspective condition), presented before the wolf's segment and offering insight into her version of the story. Following the target segment, both excerpts included an unrelated scene and a final wrap-up segment, during which the true culprit is ultimately revealed (unexpectedly, it is the rabbit, a friend of Little Red Riding Hood). These final scenes (Segments 4 and 5 in Fig. 1) differed slightly across conditions to ensure both excerpts were matched in total duration.

2.3. Film comprehension measures (attention checks)

Children were asked four multiple choice questions regarding key characters and events in the film to assess film comprehension. The questions were administered immediately after viewing the film clip and focused on key elements of the plot ('What was the Wolf's job?', 'Who is the bad guy in this film?', 'What does Red's granny sell?', 'Who is working with the Wolf?').

2.4. Trait measures

Openness to Experience. Trait openness to experience was assessed using the 8-item openness subscale of the International English Big-Five Mini-Markers (Thompson, 2008). In this validated self-report questionnaire, participants rate the accuracy with which ad jectives describe themselves using a 5-point Likert scale ranging from 1 (very inaccurate) to 5 (very accurate). A higher sum score indicates higher openness (range 8-40). This task was completed by children's guardians, in line with previous research using informant reports to assess children's personality characteristics (cf. Shiner, 1998; De Fruyt et al., 2006). Guardian reports are commonly used in developmental research because they provide valuable assessments of children's relatively stable traits, particularly for constructs that may be difficult for children to evaluate reliably themselves (De Fruyt et al., 2006).

Film and TV Expertise. Children and their guardians listed the films and TV programs the child has watched in the last month. Their answers were combined and coded for the number of genres watched and quality of films and TV shows watched. As for the number of genres, each listed title was assigned to one of nine genre categories based on Silvia and Berg's (2011) classification, using genre information from Rotten Tomatoes. The quality of films and TV shows watched was assessed using average ratings from public film rating lists, including Rotten Tomatoes and IMDb. Higher scores on both measures were taken as an index of higher film expertise. Children and their guardians also reported on their frequency and exposure to film, by adapting Silvia and Berg's (2011) measure of film experience. Two frequency questions with open-ended answers were presented: 'In a normal week, how much time do you/does your child spend watching television?'; 'In a normal month, how many films do you/does your child watch?'. Responses were averaged across children and their guardians, and frequency of film and TV viewing was calculated by

summing both frequency questions, with higher scores indicating higher film and TV expertise. For analyses, a single composite measure of film and TV expertise was calculated by z-scoring and combining scores on the range of film and TV genres, quality of film and TV viewing, and frequency of film and TV viewing. These measures were positively correlated with one another, with correlations ranging from r = .23 to r = .39 (film fre quency-film genre: r = .39, p < .001; film frequency-film quality: r = .23, p = .005; film genre-film quality: r = .25, p = .002).

2.5. Open-mindedness assessment tasks

Following film viewing, children completed a series of open-mindedness tasks within Qualtrics alongside an experimenter who entered their answers, except for the Wisconsin Card Sorting Task (Miyake et al., 2000) which was run through Pavlovia. The tasks were presented in four different orders to account for potential fatigue effects.

Creativity. The revised version of the Alternative Uses Test (AUT; George & Wiley, 2019; Guilford, 1967) provided a creativity indicator for each participant. Children were asked to provide one alternative/creative use for each of ten common household items presented through pictures (e.g. a paperclip, shoe, or coffee mug). Children provided their responses verbally to the experimenter, who transcribed each response directly into the Qualtrics form and was available to clarify the task instructions if needed. All responses were included as valid. If a participant provided more than one use only the first use was coded. Original instructions from George and Wiley (2019) were simplified to be suitable for children, by adapting Gaither et al. (2020, p. 4) modified version to the present study: ‘Now, there are some regular ways you can use these common household objects. But can you tell me a crazy way you can think of to use each object? They can be used in ways they never been used before’. Responses were later coded for originality, determined as whether the response met the following categories defined by George and Wiley (2019): the response

is (1) uncommon (not thought of or mentioned by many other people), (2) remote (differs from the obvious use of the object), and (3) clever (an appropriate and insightful use). Creativity scores for each alternative use range from 1 (not at all novel/remote/clever) to 5 (highly novel/ clever/remote). Following Guilford, (1967) scoring guidelines, responses reflecting the conventional use of the object received the lowest originality score (1). Coding was conducted blind to participant condition, and responses were presented in a random order by two independent coders. Interrater reliability between the coders was assessed using the Intraclass Correlation Coefficient (ICC) in the R programming language (package psych R package), applying a two-way mixed-effects model with consistency. Inter-rater consistency was excellent, ICC (3, k = 2) = .93, 95% CI [.91, .95]. A sum score was calculated for each participant (range 10-50), with higher scores indicating greater creativity, and final scores were computed by averaging ratings across the two coders.

Imaginability. Hassabis et al.'s (2007) scene construction paradigm was adapted, whereby children were asked to imagine a beach scene in their mind's eye and provide a detailed description about their imagined scene verbally. Instructions from Hassabis et al. (2007) were simplified to be suitable for children: 'Imagine this! I'm going to ask you to make a picture in your mind. Imagine you are sitting on a sandy beach on a lovely, sunny day. What do you see, hear, and feel? Can you tell me what you imagine? Give me as much detail as you can!'. When children stopped providing their description, the experimenter gave them a follow-up prompt: 'is there anything else you can see, hear, or feel at the beach?'. The experimenter asked the follow-up prompt twice or until the child indicated they did not have any more details to provide (whichever came first).

Children then answered some questions about their imagined scene. Responses were coded based on participants' reports of event clarity,

visual perspective, and ease of recall the event to mind. These scales were adapted from a previous study that examined prospection and episodic memory in 5-9 years old children (Coughlin et al., 2014). To assess event clarity, participants were asked to rate how clear the imagined scene looked in their mind on a scale ranging from 0 to 6 (0 = no clarity at all; 6 = extreme clarity); each point was illustrated by a smiley face with a 'thought bubble' that varied in content across pictures (i.e., the lowest point on the scale showed an empty picture; the highest point showed a very detailed and colourful picture; intermediate points showed pictures that show gradually increasing levels of details and colour). To assess visual perspective, children were asked to indicate whether they were thinking about the imagined scene as if they were there (1 = first-person visual perspective) or from the outside (0 = third-person visual perspective). These two options were illustrated by two pictures showing a sandy beach from the first- (viewed from within the scene) and third-person visual perspective (viewed from the outside by an external character), respectively. To assess ease of recall, children were asked to rate how quickly the imagined scene came to their mind on a 3-point scale. The three points were illustrated by three pictures: the first portrayed a tortoise (1 = slowly); the second portrayed a solid black dot (2 = somewhat quickly); the third portrayed a hare (3 = quickly).

Following Hassabis et al. (2007), the descriptions of the scenes were transcribed and coded by two independent coders on four dimensions, including the number of people/objects mentioned (entities present), sensory descriptions, spatial references, and actions, emotions, and mental states described, to create a content index. Furthermore, the coders rated the overall quality of description on a scale from 0 to 10. As for the previous task, coding was blind to participant condition and responses were randomised. Interrater consistency for the Experiential Index was excellent, ICC (3, k = 2) = .95, 95% CI [.94, .97], indicating high

agreement between coders. The total of these scores, along with scores from three additional scales (event clarity, visual perspective, and ease of recall), was used to compute the Experiential Index, with higher sum scores indicating greater imaginability (range 1-48). Experiential Index scores from the two coders were then averaged to create a single composite score for each participant.

Openness to New Evidence. We administered a simplified version of Galinsky and Moskowitz's (2000) trait hypothesis-testing task, which is designed to measure how open participants are to seeking and considering hypothesis-disconfirming evidence after being given an initial, biasing piece of information. Participants were presented with biasing evidence about an individual who is said to be an extrovert. The original instructions were simplified to be suitable for children: 'I'm going to ask you to imagine something new. Let's imagine that a new classmate comes at your school. Your teacher tells you that she/he is very friendly and pleasant. Surely, she/he will make many friends! Imagine you are going to meet him/her. You get to be a detective to find out about his/her personality. I am going to show you 12 questions, and you can choose 6 questions to ask him/her'. Instead of the original list of 25 questions (Galinsky & Moskowitz, 2000), children were given 12 cards with illustrations, each of which presented one question. Questions included hypothesis-confirming (extrovert questions; e.g., "What do you like about hanging out in a big group?") and disconfirming items (introvert questions; e.g., "What do you like about spending time with only one person?"). Children were asked to select exactly six questions. An openness to new evidence score was calculated as the difference in the proportion of hypothesis-confirming (extro version) and -disconfirming (introversion) questions selected, with a possible range of -1-1; actual scores included decimals within this range. A positive score indicates a preference to ask hypothesis-confirming (extroversion) questions and therefore lower openness to new evidence, and a negative

score indicates a preference to ask hypothesis-disconfirming (introversion) questions and thus higher openness to new evidence.

Cognitive Flexibility. A computerised version of the Wisconsin Card Sorting Task (WCST; Miyake et al., 2000), administered via Pavlovia, was used to evaluate cognitive flexibility. Children were asked to sort cards according to one of three classification rules: colour, shape, or number of symbols. The sorting rule was not explicitly stated; instead, participants were required to infer the correct rule based on feedback (“correct” or “incorrect”) provided after each trial. Periodically, the sorting rule changed without warning, requiring participants to adjust their strategy accordingly. The dependent variable was the number of perseverative errors (i.e. sum of trials on which participants persisted with an incorrect sorting rule), with a higher number of perseverative errors indicating lower cognitive flexibility.

2.6. Online measures

Eye movements. Eye movements were recorded while participants watched the film using an EyeLink 1000 Plus desktop-mounted SR Research eye-tracker in remote mode, with eye movements sampled at a frequency of 500 Hz, which allowed free movement of the head. Viewing was binocular, but only one eye was tracked at a time. The output variables for eye movements were pupil dilation and number of fixations, calculated as the % change in average pupil dilation between the baseline scene and target scene (wolf’s perspective), and the % change in number of fixations (per second) between the baseline scene and target scene. The calculation of a % change measure, using ((target - baseline) / baseline) x 100, allowed us to control for individual differences in baseline pupil diameter and fixation behaviour between groups.

Heart Rate. Heart rate (HR), measured in beats per minute, was assessed using a Biopac MP150 and Acqknowledge 4.4 software (BIOPAC Systems Inc., USA). Pre-gelled disposable Kendall H124SG electrodes with

a sensor diameter of 24 mm were used. Electrodes were positioned according to a modified chest lead configuration: one below the right clavicle, another below the left clavicle, and a third below the left lateral margin of the chest. The signal was recorded at a sampling rate of 1000 Hz, with a bandpass filter of 0.5-35 Hz applied. Artifacts due to movement were manually identified and excluded from analysis. The output variable for heart rate was the % change in heart rate between the baseline and the target scene, which controlled for individual differences in resting heart rate.

Electrodermal activity. Electrodermal activity was measured using a Biopac MP150 system and Acqknowledge 4.4 software (Biopac Systems, Inc., Goleta, CA, USA). Two snap EL507 electrodes with a 16 mm diameter of active area, pre-gelled with isotonic gel, were attached to the volar surface of the medial and distal phalanges of the participant's non-dominant hand, following the procedure described by Dawson et al. (2000). Electrodermal activity was filtered using a low-pass filter with a cutoff frequency of 0.05 Hz to remove high-frequency noise, and down-sampled to 10 Hz sampling rate (Boucsein, 2012). Artifacts due to movement were manually identified and excluded from analysis. The output variable for electrodermal activity was the Skin Conductance Level (SCL), calculated as the % change in skin conductance level between the baseline and the target scene, which controlled for individual differences in electrodermal activity.

2.7. Procedure

Children were tested individually in a quiet University laboratory. They were accompanied by their legal guardians. We obtained informed written consent from guardians and verbal assent from children before they took part in the study, and a unique identifier code was created for each participant. Prior to the main tasks, guardians completed a short survey that assessed their child's open-mindedness traits (openness to experience), and both the child and their guardian provided details of the child's film and TV habits (film expertise), as described above.

During the experimental manipulation, children in the two film conditions watched their allocated film excerpt (single or multiple perspectives) while their online responses (eye movements, heart rate and electrodermal activity) were recorded using an SR Research EyeLink 1000 plus eye-tracker and Biopac system, described above. Stimuli were presented on a 22-in. colour monitor screen, with a screen resolution of 1920 × 1080 pixels, positioned approximately 60 cm from the participant. At the beginning of the experiment, a nine-point calibration was used to calibrate and validate participants' eye movements, and a drift correction check (central fixation point on the screen) was displayed at the start of each film scene using the standard EyeLink procedures. After watching the film, children completed comprehension questions and open-mindedness assessment measures. Children in the control condition did not watch a film or complete any additional task and proceeded directly to the same open-mindedness assessment measures. After completing the study, children were then reunited with their parents, thanked for their participation, fully debriefed, and awarded their compensation.

2.8. Data analysis

The analyses were pre-registered, and all datasets along with analysis scripts are accessible on the Open Science Framework (see https://osf.io/szetn/). Statistical analyses were conducted in R Version 4.4. We adopted the standard significance level of ps < .05 for all inferential tests. The Shapiro-Wilk tests were significant for all measures ($p < .001$), except creativity ($p = .276$) and imaginability ($p = .654$), suggesting that the majority of our dependent variables did not follow a normal distribution. Non-parametric tests were used for variables that did not meet the assumption of normality. These analyses were not included in the preregistration, as there was no prior expectation that the data would violate normality assumptions. However, the overall structure of the statistical testing re mains consistent with the preregistered analysis plan (we had originally intended to use linear mixed models rather than generalised linear mixed models).

Firstly, to test whether there were any baseline differences between the three condition groups in film and TV expertise (reported by both the children and their guardian) or the open-mindedness trait (openness to experience; reported by the children's guardian), we used two generalised linear mixed-effects models-one for openness to experience and one for the composite measure of film and TV expertise-with condition as the fixed factor and random effects for task order. Where there were zero variance or singularity issues, the random effect structure for task order was removed. To accommodate the three levels of condition, we applied Helmert contrast coding: the first contrast compared the two film conditions to the non-film control condition (i.e. film vs no film), and the second compared the single and multiple film conditions (excluding the control condition).

Secondly, to test the central hypothesis, each of the four dependent measures (open-mindedness assessment tasks) was analysed separately

using general linear (mixed-effects) models, with condition (single vs multiple vs no film) as the between-groups inde pendent variable. As in the baseline analyses, Helmert contrast coding was applied to account for the three levels of condition. In addition, the models included fixed effects predictors for openness to experience, the film and TV expertise composite index, and age (in months; to account for age-related variation), along with random effects for task order (where singularity issues were not present).

Thirdly, we assessed the effect of film condition on the online measures (pupil dilation, number of fixations, heart rate, and skin conductance) using generalised linear models, with condition as the between-groups independent variable. For each online measure, contrast coding was used to compare the single-perspective and multiple-perspective film conditions. In addition, openness to experience, the film and TV expertise index, and age were included as fixed effect predictors. One participant (ID: MCHA1302C) was excluded from the analysis of number of fixations due to an extreme value in the change in number of fixations.

To complement the pre-registered frequentist analyses, we conducted exploratory equivalence tests using the Two One-Sided Tests (TOST) procedure. The smallest effect size of interest (SESOI) was defined as ±0.20 standard deviations of the relevant outcome, corresponding to a small effect size and consistent with meta-analytic evidence suggesting small-to-moderate effects of fiction exposure on cognitive abilities (Wimmer et al., 2024). For normally distributed outcomes, scores were z-standardised prior to fitting the linear models and were evaluated against equivalence bounds of ±0.20. For outcomes analysed using generalised linear (mixed-effects) models, estimated marginal mean contrasts and their confidence intervals were calculated on the response scale and evaluated against outcome-specific bounds defined as ±0.20 times the observed standard deviation of the outcome. Unlike traditional

null hypothesis significance testing, which evaluates whether an effect differs from zero, equivalence testing evaluates whether an effect is sufficiently small to be considered practically negligible, based on whether it falls entirely within the predefined equivalence bounds. Effects were classified as equivalent when the 90% confidence interval lay entirely within the equivalence bounds, indicating that effects larger than the SESOI could be rejected. Effects were classified as non-equivalent when the confidence interval lay entirely outside the bounds, indicating that the effect exceeded the SESOI and was therefore potentially meaningful. Finally, effects were classified as undecided (inconclusive) when the confidence interval overlapped the equivalence bounds, indicating insufficient pre cision to determine whether the effect was practically negligible or meaningfully different from zero.

Finally, we conducted a correlation analysis to examine the relationships among the four open-mindedness assessment measures, openness to experience, the film and TV expertise index, and online measures. Since online measures were only collected from par ticipants who watched a film, these correlations excluded participants in the no film condition. To account for multiple comparisons across the variables, false discovery rate (FDR) corrections were applied.

3. Results

Table 1 reports the descriptive statistics for each measure and condition, along with the results of the fixed-effect contrasts.

In terms of baseline measures, specifically the comparisons across the three experimental groups on the covariates included in the models (film and TV expertise index and openness to experience), the models indicated no significant differences between the three conditions in either the film and TV expertise index or openness to experience (see Table 1).

Regarding our central hypotheses, the models revealed a significant difference in creativity (AUT) between the no-film condition and the film conditions, with participants in the no-film condition scoring higher on creativity than those in the film conditions (see Table 1). No significant difference emerged between the single-and multiple-perspective film conditions (see Table 1). No condition effects were observed for the remaining three indicators of open-mindedness-imaginability, openness to new evidence, and cognitive flexibility (see Table 1). Age showed a small positive association with openness to new evidence (Est =.005, SE =.002, t = 2.09, p = .037, 95% CI [.000, .01]), indicating higher scores (e.g., more hypothesis-confirming items) in this task with increasing age. The effect of age was not significant for the remaining open-mindedness measures (all ps > .05). Additionally, openness to experience positively predicted imaginability (Est = 1.388, SE =.69, t = 2.00, p = .047, 95% CI [0.02, 2.76]), but not the other open-mindedness measures (all ps > 0.317). The film and TV expertise index had no significant effects on any of the open-mindedness measures (all ps >.05).

Equivalence tests (TOST) supported the significant effects observed in the frequentist analyses for creativity, while several of the null effects found in the frequentist analyses were considered inconclusive. Specifically, in line with the linear model results, for creativity, the control vs film conditions contrast was non-equivalent, as the confidence interval exceeded the predefined equivalence bounds (±0.20), indicating a meaningful effect ([.25, .81]), while the multiple vs single perspective condition contrast was incon clusive ([-.16, .48]). In contrast, cognitive flexibility, imaginability and openness to new evidence yielded inconclusive results for all contrasts, as their confidence intervals overlapped the equivalence bounds, preventing conclusions regarding whether effects were practically negligible or meaningfully different from zero. The effects of condition on the open-mindedness measures are shown

in Fig. 2.

Turning to the online measures, the generalised linear models indicated greater electrodermal activity among participants in the multiple-perspective film condition compared to those in the single-perspective film condition (see Table 1). The remaining online measures (pupil dilation, number of fixations, and heart rate) did not show significant differences. However, pupil dilation and heart rate followed the same trend. No significant effects were found for openness to experience or the film and TV expertise index on any of the online measures. However, age had a significant positive effect on the number of fixations, with older participants showing a greater number of fixations (Est =.079, SE =.04, t = 2.24, p = .027, 95% CI [.01, .15]).

Equivalence tests (TOST) for the real-time measures showed a non-equivalent effect on electrodermal activity, with the confidence interval lying entirely outside the equivalence bounds ([-37.8, -12.3]), indicating a meaningful effect of condition and supporting the frequentist analysis. In contrast, pupil dilation, number of fixations, and heart rate all showed confidence intervals that overlapped the equivalence bounds, preventing conclusions about practical equivalence or meaningful differences. The effects of condition on the online measures are shown in Fig. 3.

A series of non-parametric correlations (Kendall’s Rank Correlation) were conducted to examine associations among trait measures (age in months, openness to experience, and film and TV expertise index), open-mindedness assessment measures (creativity, imag inability, openness to new evidence, and cognitive flexibility), and online measures (pupil dilation, number of fixations, heart rate, and electrodermal activity). The scores for openness to new evidence and cognitive flexibility (WCST) were reverse coded so that higher values consistently indicated greater open-mindedness across all measures. Correlations were limited to the 100

participants who completed the film conditions to ensure comparability of the measures. Given the number of variables included in each correlation, we used False Discovery Rate (FDR) correction for the p-values, which is commonly used to adjust for multiple comparisons, including multiple correlations (Storey, 2025). The resulting correlation matrix is shown in Fig. 4. The correlation analysis showed no significant associations among the variables (all ps >.05).

4. Discussion

The present study empirically tested the familiar claim that art can open people's minds (Lopes, 2005; Smith, 2017). Specifically, we examined whether a film depicting multiple perspectives on the same event would enhance characteristics of open-mindedness (creativity, imaginability, openness to new evidence, and cognitive flexibility) more than a film presenting a single perspective in children aged 8-12 years old. Overall, our results did not support this hypothesis: children in the film conditions did not score higher than those in the no-film control group on any open-mindedness measure, and no differences emerged between the multiple-and single-perspective film conditions. Furthermore, after correcting for false discovery rate, no significant correlations were found among the open-mindedness measures, the real-time measures (eye movements, heart rate and electrodermal activity), and the other pre dictors (film expertise, openness to experience). These findings call into question the short-term impact of watching films, whether showing single or multiple perspectives, on children's open-mindedness.

Our results, which show no positive effect of film viewing on open-mindedness, are consistent with Carbone et al. (2026)'s findings on the cognitive impact of films on adults' characteristics of open-mindedness, where most of the open-mindedness characteristics considered were unaffected by a single film viewing. Together, they provide very limited support for the Aesthetic Cognitivist claim that films,

as a form of art, can broaden people's minds. Moreover, our findings align with previous research showing that brief exposure to literary fiction has no effect on open-mindedness (Wimmer et al., 2022; Wimmer et al., 2025). Indeed, Wimmer et al. (2025) investigated whether abstaining from narrative fiction for seven days would impair adults' performance on mentalizing tasks and empathy questionnaires compared with those who continued their usual fiction consumption. They found no significant differences between groups, challenging the view that short-term absence from fiction affects socio-cognitive abilities.

However, we cannot rule out the possibility that the null effects observed in the frequentist analyses reflect limited statistical precision rather than genuine evidence for the absence of effects. Indeed, the equivalence tests yielded largely inconclusive results for most of the non-significant effects identified in the regression analyses. Specifically, inconclusive patterns emerged for imaginability, cognitive flexibility and openness to new evidence. The overlapping confidence intervals suggest that the estimates were not suffi ciently precise to determine whether the observed effects were practically negligible or meaningfully different from zero. One possible explanation is the substantial variability observed across participants in these measures, which resulted in wider confidence intervals and greater uncertainty around the estimates. In addition, the relatively conservative equivalence bounds adopted in the present study (± 0.20), based on meta-analytic evidence reported by Wimmer et al. (2024), required high precision for effects to be classified as statistically equivalent. Taken together, results from the equivalence tests suggest that several of the non-significant findings remain inconclusive, warranting caution in interpreting them as evidence of no effect.

Nevertheless, physiological measures revealed greater electrodermal activity in children exposed to multiple perspectives compared to those who viewed a single perspective, as confirmed by both

the frequentist and equivalence test analyses. None of the other real-time measures (pupil dilation, number of fixations, and heart rate) showed significant differences between conditions, but most of them exhibited a similar trend of increased responses in children in the multiple-perspective condition, whereas equivalence testing was inconclusive for these measures. Greater electrodermal activity is commonly interpreted as an indicator of heightened arousal and emotional engagement (Critchley, 2002; Dawson et al., 2000), suggesting that narratives presenting multiple viewpoints may be more stimulating for children than single-perspective stories. This increased physiological activity in the multiple perspectives condition, however, did not lead to improvements in the subsequently assessed open-mindedness measures. Alternatively, the increased electrodermal activity may instead reflect greater cognitive load (Andreassi, 2007), as processing and integrating multiple perspectives may demand more mental effort- even though children aged 8-12 generally demonstrate core perspective-taking skills (Wellman, 2014). These findings indicate that while multiple perspectives may either prompt children to experience more intense emotional engagement or greater cognitive effort in synthesising the perspectives, this does not necessarily translate into immediate gains in open-mindedness.

Unexpectedly, children in the control condition scored higher on creativity than those assessed after watching either film condition, a pattern confirmed by both the frequentist and equivalence analyses. This suggests that film viewing, regardless of perspective, may not foster and could even temporarily inhibit certain creative processes. Prior research suggests that, for some individuals, exposure to concrete examples or cognitive overstimulation before tasks involving divergent thinking and executive functions can inhibit per formance (Chen, 2020). This aligns with the reduction hypothesis, which proposes that encountering specific examples or complex stimuli beforehand can narrow creative responses,

limiting originality and cognitive flexibility (van der Voort & Valkenburg, 1994). Supporting this view, Rhodes et al. (2020) found that children exposed to fantastical TV content performed worse on executive function tasks, such as cognitive flexibility, possibly due to the cognitive load required to track unexpected events. In our study, watching films (regardless of whether they presented single or multiple perspectives) may have provided specific examples or caused overstimulation, inadvertently constraining children's ability to generate novel ideas during the subsequent divergent thinking assessment. Similarly, our finding is consistent with Suggate (2025), who reported that, compared to reading, viewing film clips was associated with initially slower performance on a mental comparison task. Several mechanisms may account for this effect. One possibility is that film viewing reduces the need for internally generated imagery, as visual content is externally provided, whereas reading requires active mental construction (Valkenburg and Van der Voort, 1994; Suggate, 2025). A second explanation is that film viewing imposes greater perceptual demands, potentially leading to short-term cognitive fatigue and reduced performance on sub sequent tasks requiring imaginative processing (Magliano et al., 2013; Suggate, 2025). Finally, film viewing may encourage a more passive mode of engagement, which is less conducive to creativity, as creative thinking is closely linked to active cognitive involvement and intrinsic motivation (Collins and Amabile, 1999; Tan et al., 2019).

Our finding contrasts with previous research showing that certain narrative features, such as magical or science-fictional elements, can enhance creativity, imagination, and scientific reasoning (Subbotsky et al., 2010; Lin et al., 2013). For example, Subbotsky et al. (2010) found that children aged 4-6 who viewed a film clip featuring a magic trick scored higher on creativity tests than those who saw a clip with a non-magical event. This effect was also replicated with 8-year-olds. A key difference

between their work and ours lies in the specific narrative features manipulated: Subbotsky et al. focused on magical content, which may more directly stretch imagination and creativity. In our study, although we used an animated film as stimulus, we manipulated the number of character perspectives without altering fantastical elements. This difference suggests that effects on creativity may depend on the specific narrative features manipulated.

Additionally, in our study, creativity was assessed using the Alternative Uses Task (AUT; George & Wiley, 2019; Guilford, 1967), which measures divergent thinking. Divergent thinking is closely linked to executive functions such as cognitive flexibility and working memory (Palmiero et al., 2022). It differs from the story-based or narrative-imagination assessments typically employed in prior research, which assess forms of creativity distinct from divergent thinking-a cognitive skill more closely associated with the ability of taking novel perspectives and, in turn, to open-mindedness (Wimmer et al., 2022). For example, Subbotsky et al. assessed creativity with the Thinking Creatively in Action and Movement test (Torrance, 1975) and drawings of nonexistent objects. In these tasks, participants create something new (actions in Torrance's test or objects in the drawing task) rather than generating alternative uses as required in the AUT. Thus, the effects of film watching on creativity may depend on how creativity is operationalised.

Additionally, openness to experience, a personality trait linked to curiosity, imagination, and receptiveness to new ideas (McCrae & Costa, 1997), was significantly related to imaginability in the statistical model. Although this association was small and close to the conventional significance threshold, it is consistent with the possibility that individual differences in personality relate to imaginative abilities. Conversely, film and TV expertise were not significantly associated with any of the open-mindedness measures in children, providing no evidence that prior

media exposure was related to individual differences in these traits within the age range tested. This contrasts with previous findings in adults (Carbone et al., 2026), where film expertise predicted creativity (Experiment 1), and watching a larger number and wider variety of films and TV programmes was associated with greater open-mindedness traits (Experiment 2). This discrepancy may reflect the fact that children have yet to develop stable cinematic expertise or may be less reliable in reporting it, whereas adults accumulate such experience over time, which may be associated with differences in cognitive skills (e.g., creativity) and personality traits (e.g., openness to experience). Effects of fiction may therefore emerge cumulatively rather than immediately, in line with Mar's (2018) proposal that narrative experiences may contribute to social cognition gradually through repeated and sustained engagement over time, rather than through limited exposures.

4.1. Limitations and future directions

Our study has certain limitations that future research should address. Although we examined multiple facets of open-mindedness, there remain other dimensions of open-mindedness that were not assessed here, which might be more sensitive to the influence of film viewing and specific cinematic features. Philosophically, the definition of open-mindedness continues to be debated (Fantl, 2018; Riggs, 2018; Alsharif and Symons, 2021; Khorasanee, 2024), which complicates the task of operationalising this construct into reliable and valid empirical measures. Future work would benefit from investigating a broader spectrum of open-mindedness indicators, potentially using techniques like principal component analysis to clarify its multidimensional nature and to explore whether particular film characteristics differentially affect these dimensions.

Additionally, some measures used in the present study, such as the Alternative Uses Task (AUT) and the scene construction task, have known limitations. The AUT has been criticised for capturing divergent thinking

in constrained and decontextualised settings, which may not fully reflect real-world creativity (e.g., Plucker & Makel, 2010). Similarly, scene construction tasks rely on verbal descriptions and may therefore be influenced by linguistic ability and narrative skill, in addition to imaginative capacity (Hassabis et al., 2007). To mitigate these concerns, both tasks were administered and scored using established procedures (George and Wiley, 2019; Hassabis et al., 2007), which ensure that all children received identical prompts and were evaluated using predefined scoring criteria focused on the content and richness of mental imagery rather than linguistic sophistication. While these steps strengthen the robustness of the findings, future research should incorporate more ecologically valid measures and direct assessments of language ability to further strengthen construct validity. Future work could also examine children's imaginative expression across a broader range of creative activities and contexts, including drawing and storytelling. Different forms of imaginative expression, like drawing, may place distinct representational demands on children and follow different developmental trajectories (Harris, 2021; Karmiloff-Smith, 1990; Lange-Küttner, 2014).

Another limitation concerns the assessment of openness to experience, which was based solely on a single parent report. Although parent reports can provide valuable information about children's personality traits (e.g., Shiner, 1998), relying on a single informant may introduce reporter-specific biases and may not capture children's own perceptions of their openness to new experiences. Future research should adopt a multi-informant approach combining parent and age-appropriate child reports to provide a more compre hensive assessment of openness to experience.

Furthermore, our study employed only one film per experimental condition. This ensured a high degree of experimental control and allowed the use of an ecologically valid, child-friendly stimulus (Hoodwinked),

while also reducing variability arising from differences in narrative structure and stylistic features across stimuli. However, the use of a single film may limit the generalisability of the findings. Moreover, although the selected clip included a manipulation of narrative perspective, it followed a relatively structured and well-known storyline with a clear progression and resolution, ultimately reducing uncertainty through the revelation of the culprit. This choice was made to minimise confounding effects of narrative complexity, as identified in Carbone et al. (2026). However, such structure may constrain opportunities for elaborative and active interpretation, potentially encouraging a more passive form of engagement. This is particularly relevant for open-mindedness, which involves the active consideration of alternative perspectives (Baehr, 2011; Baron, 1993). A further consideration is that, given the widespread familiarity of the Little Red Riding Hood narrative, children may have come with a priori knowledge of the story, and even the single-perspective condition may have elicited awareness of alternative interpretations and viewpoints based on this prior knowledge. Future research should address these limitations by repli cating the findings using a broader and more systematically varied set of stimuli and by further examining the role of active engagement in shaping these effects.

Critically, our study focused on the short-term effects of watching films with single or multiple character perspectives on char acteristics associated with open-mindedness. The absence of observed effects on certain measures may be attributed to this brief exposure. It is possible that some changes in open-mindedness develop gradually or only emerge as part of the cultivation of the skills of critical appreciation (in a range of contexts, from informal conversation to journalistic criticism and formal cinematic education). This possibility is supported by the significant associations between film expertise and open-mindedness measures in adults (Carbone et al., 2026) that are absent in children here. Moreover,

prior research indicates that the benefits of education television programmes - that is, those shows specifically designed to support children's learning and development on executive functions and language development - are enhanced when viewing is supported by parental mediation (Strouse et al., 2013; Nathanson, 2015; Yang et al., 2017), highlighting the importance of considering the role of social context in shaping the effects of media on cognitive and devel opmental outcomes. Future longitudinal studies will be important to clarify whether the impact of watching films featuring multiple perspectives on open-mindedness should be reconsidered or if these effects unfold over time and are therefore cumulative (Mar, 2018), and may additionally be shaped by contextual factors, such as caregiver-child discussions.

In addition, our study provided evidence of greater attentional and emotional engagement when viewing the film clip presenting multiple perspectives on a single event, as indicated by physiological indices. Although psychophysiological measures provide objective indicators of arousal and attentional engagement (Larsen et al., 2008), they do not capture the subjective quality, appraisal, or complexity of emotional experience. For example, they cannot distinguish whether heightened arousal reflects engagement, transportation, or distress, nor can they capture how individuals interpret or make meaning of these emotional responses. Future research should therefore combine physiological measures with self-report and qualitative assessments to more comprehensively capture the multidimensional nature of emotional responses to film.

In conclusion, our study did not find evidence that watching films depicting multiple perspectives enhances children’s open-mindedness in the short term. While multiple perspectives increased physiological arousal, this did not translate into improved open-mindedness characteristics. These findings do not support the notion that

art-specifically the art of film-can foster children's open-mindedness. Future research should examine the long-term effects on the facets of open-mindedness, cultivated over the long-term, in relation to sustained and repeated engagement with films.

Disclosure statement

The authors declare that they have no affiliations with or involvement in any organisation or entity with any financial interest, or non-financial interest, in the subject matter or materials discussed in this manuscript.

CRediT authorship contribution statement

Francesca Carbone: Writing - original draft, Investigation, Formal analysis, Data curation, Conceptualization. Angela Nyhout: Writing - review & editing, Validation, Supervision, Funding acquisition, Conceptualization. Stacie Friend: Writing - review & editing, Project administration, Funding acquisition, Conceptualization. Murray Smith: Writing - review & editing, Funding acqui sition, Conceptualization. Heather J. Ferguson: Writing - review & editing, Supervision, Project administration, Conceptualization.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.cogdev.2026.101781.

Data availability

Research Link Provided

References

Alsharif, H., & Symons, J. (2021). Open-mindedness as a corrective virtue. Philosophy, 96(1), 73-97. https://doi.org/10.1017/S0031819120000352

Anderson, R. (2016). The Rashomon effect and communication. Canadian Journal of Communication, 41(2), 249-270. https://doi.org/10.22230/cjc.2016v41n2a3068

Andreassi, J. L. (2007). Psychophysiology: Human behavior and physiological response (5th ed). Lawrence Erlbaum Associates.

Baehr, J. (2011). The structure of open-mindedness. Canadian Journal of Philosophy, 41(2), 191-213. https://doi.org/10.1353/cjp.2011.0010

Baron, J. (1993). Why teach thinking? An essay. Applied Psychology: An International Review, 42, 191-214. https://doi.org/10.1111/j.1464-0597.1993.tb00731.x

Baumberger, C. (2013). Art and understanding. Defence of aesthetic. Cognitivism. In M. Greenlee, et al. (Eds.), Bilder sehen. Perspektiven der Bildwissenschaft. (pp. 41-67). Regensburg: Schnell+ Steiner.

Beck, S. R., & Riggs, K. J. (2014). Developing thoughts about what might have been. Child Development Perspectives, 8(3), 175-179. https://doi.org/10.1111/ cdep.12082

Black, J. E., & Barnes, J. L. (2021). Pushing the boundaries of reality: Science fiction, creativity, and the moral imagination. Psychology of Aesthetics, Creativity, and the Arts, 15(2), 284. https://doi.org/10.1037/aca0000281

Boucsein, W. (2012). Electrodermal activity. Springer science & business media.

Bradley, M. M., Greenwald, M. K., Petry, M. C., & Lang, P. J. (1992). Remembering pictures: Pleasure and arousal in memory. Journal of Experimental Psychology: Learning, Memory, and Cognition, 18(2), 379-390. https://doi.org/10.1037/0278-7393.18.2.379

Brecht, B. (1964). Brecht on theatre: The development of an aesthetic. Macmillan.

Carbone, F., Pitt, A., Nyhout, A., Friend, S., Smith, M., & Ferguson, H. J. (2026). Art opening minds: An experimental study on the effects of temporal and perspectival complexity in film on open-mindedness. Quarterly Journal of Experimental Psychology. https://doi.org/10.1177/17470218251333747

Chamorro-Premuzic, T., Reimers, S., Hsu, A., & Ahmetoglu, G. (2009). Who art thou? Personality predictors of artistic preferences in a large UK sample: The importance of openness. British Journal of Psychology, 100(3), 501-516. https://doi.org/10.1348/000712608X366867

Chen, B. (2020). Enhance creative performance via exposure to examples: The role of cognitive thinking style. Personality and Individual Differences, 154, Article 109663. https://doi.org/10.1016/j.paid.2019.109663

Collins, M. A., & Amabile, T. M. (1999). Motivation and creativity. Handbook of Creativity, 297, 1051-1057.

Coughlin, C., Lyons, K. E., & Ghetti, S. (2014). Remembering the past to envision the future in middle childhood: Developmental linkages between prospection and episodic memory. Cognitive Development, 30, 96-110. https://doi.org/10.1016/j.cogdev.2014.02.001

Critchley, H. D. (2002). Electrodermal responses: What happens in the brain. The Neuroscientist, 8(2), 132-142. https://doi.org/10.1177/107385840200800209

Dawson, M. E., Schell, A. M., & Filion, D. L. (2000). The electrodermal system. In C. G. Cacioppo, L. G. Tassinary, & G. Berntson (Eds.), Handbook of psychophysiology (2nd ed., pp. 200-223). Cambridge University Press.

De Fruyt, F., Bartels, M., Van Leeuwen, K. G., De Clercq, B., Decuyper, M., & Mervielde, I. (2006). Five types of personality continuity in childhood and adolescence. Journal of Personality and Social Psychology, 91(3), 538. https://doi.org/10.1037/0022-3514.91.3.538

Djikic, M., Oatley, K., & Moldoveanu, M. C. (2013). Reading other minds: Effects of literature on empathy. Scientific Study of Literature, 3(1), 28-47. https://doi.org/10.1075/ssol.3.1.06dji

Dodell-Feder, D., & Tamir, D. I. (2018). Fiction reading has a small positive impact on social cognition: A meta-analysis. Journal of Experimental Psychology: General, 147(11), 1713. https://doi.org/10.1037/xge0000395

Edwards, C., Edwards, T., & Leech, T. (Directors) (2005). Hoodwinked! [Film]. Kanbar Entertainment.

Eisner, E. W. (2003). The arts and the creation of mind. Language Arts, 80(5), 340-344. https://doi.org/10.58680/la2003322

Fantl, J. (2018). The limitations of the open mind. Oxford University Press.

Gaither, S. E., Fan, S. P., & Kinzler, K. D. (2020). Thinking about multiple identities boosts children's flexible thinking. Developmental Science, 23(1), Article e0012871. https://doi.org/10.1111/desc.12871

Galinsky, A. D., & Moskowitz, G. B. (2000). Perspective-taking: Decreasing stereotype expression, stereotype accessibility, and in-group favoritism. Journal of Personality and Social Psychology, 78(4), 708. https://doi.org/10.1037//0022-3514.78.4.708

George, T., & Wiley, J. (2019). Fixation, flexibility, and forgetting during alternate uses tasks. Psychology of Aesthetics, Creativity, and the Arts, 13(3), 305. https://doi.org/10.1037/aca0000173

Goldstein, T. R., & Winner, E. (2012). Enhancing empathy and theory of mind. Journal of Cognition and Development, 13(1), 19-37. https://doi.org/10.1080/15248372.2011.573514

Greene, M. (2000). Releasing the imagination: Essays on education, the arts, and social change. John Wiley & Sons.

Guilford, J. P. (1967). Creativity: Yesterday, today and tomorrow. The Journal of Creative Behavior, 1(1), 3-14. https://doi.org/10.1002/j.2162-6057.1967.tb00002.x

Harris, P. L. (2021). Early constraints on the imagination: The realism of young children. Child Development, 92(2), 466-483. https://doi.org/10.1111/cdev.13487

Hassabis, D., Kumaran, D., & Maguire, E. A. (2007). Using imagination to understand the neural basis of episodic memory. Journal of Neuroscience, 27(52), 14365-14374. https://doi.org/10.1523/JNEUROSCI.4549-07.2007

Hinten, A. E., Scarf, D., & Imuta, K. (2025). Meta-analytic review of the short-term effects of media exposure on children's attention and executive functions. Developmental Science, 28(6), Article e70069. https://doi.org/10.1111/desc.70069

Hodges, T. S., McTigue, E., Wright, K. L., Franks, A. D., & Matthews, S. D. (2018). Transacting with characters: Teaching children perspective taking with authentic literature. Journal of Research in Childhood Education, 32(3), 343-362. https://doi.org/10.1080/02568543.2018.1464529

Jackowski, J. M., Levin, D. T., Eden, A., Grady, S. M., Plantinga, C., & Smith, M. (2025). Theory of mind negatively predicts reflection and positively predicts moral understanding. Projections, 19(3), 3-31. https://doi.org/10.3167/proj.2025.190302

Karmiloff-Smith, A. (1990). Constraints on representational change: Evidence from children's drawing. Cognition, 34, 57-83. https://doi.org/10.1016/0010-0277(90)90031-E

Kaufman, J. C., & Beghetto, R. A. (2009). Beyond big and little: The four C model of creativity. Review of General Psychology, 13, 1-12. https://doi.org/10.1037/ a0013688

Kes¸s¸afo˘glu, D., Küntay, A., & Uzunda˘g, B. A. (2024). Immediate and delayed effects of fantastical content on children's executive functions and mental transformation. Journal of Experimental Child Psychology, 248, Article 106067. https://doi.org/10.1016/j.jecp.2024.106067

Khorasanee, K. (2024). Being open-minded about open-mindedness. Philosophy, 99(2), 191-221. https://doi.org/10.1017/S0031819123000396

Kidd, D. C., & Castano, E. (2013). Reading literary fiction improves theory of mind. Science, 342(6156), 377-380. https://doi.org/10.1126/science.1239918

Kolb, B., & Gibb, R. (2011). Brain plasticity and behaviour in the developing brain. Journal of the Canadian Academy of Child and Adolescent Psychiatry, 20(4), 265.

Lang, A., Zhou, S., Schwartz, N., Bolls, P. D., & Potter, R. F. (2000). The effects of edits on arousal, attention, and memory for television messages: When an edit is an edit can an edit be too much? Journal of Broadcasting & Electronic Media, 44(1), 94-109. https://doi.org/10.1207/s15506878jobem4401_7

Lange-Küttner, C. (2014). Do drawing stages really exist? Children's early mapping of perspective. Psychology of Aesthetics, Creativity, and the Arts, 8(2), 168. https:// doi.org/10.1037/a0036199

Larsen, J. T., Berntson, G. G., Poehlmann, K. M., Ito, T. A., & Cacioppo, J. T. (2008). The psychophysiology of emotion. Handbook of Emotions, 3, 180-195.

Lenhart, J., & Richter, T. (2024a). Media exposure and preschoolers' social-cognitive development. British Journal of Developmental Psychology, 42(2), 234-256. https://doi.org/10.1111/bjdp.12478

Lenhart, J., & Richter, T. (2024b). Does watching fictional TV series increase social-cognitive skills? Scientific Study of Literature, 13(1), 22-49. https://doi.org/ 10.61645/ssol.184

Lenhart, J., & Richter, T. (2025). Does reading a single short story of literary fiction improve social-cognitive skills? Testing the priming hypothesis. Psychology of Aesthetics, Creativity, and the Arts, 19(1), 165-179. https://doi.org/10.1037/aca0000533

Lillard, A. S., Drell, M. B., Richey, E. M., Boguszewski, K., & Smith, E. D. (2015). Further examination of the immediate impact of television on children's executive function. Developmental Psychology, 51(6), 792. https://doi.org/10.1037/a0039097

Lin, K. Y., Tsai, F. H., Chien, H. M., & Chang, L. T. (2013). Effects of a science fiction film on the technological creativity of middle school students. Eurasia Journal of Mathematics, Science and Technology Education, 9(2), 191-200. https://doi.org/10.12973/eurasia.2013.929a

Lopes, D. (2005). Sight and sensibility: Evaluating pictures. Clarendon Press.

Magliano, J. P., Loschky, L. C., Clinton, J. A., & Larson, A. M. (2013). Is reading the same as viewing? An exploration of the similarities and differences between processing text and visually based narratives. In B. Miller, L. Cutting, & P. McCardle (Eds.), Unravelling the behavioral, neurobiological, & genetic components of reading comprehension (pp. 78-90). Brookes Publishing.

Mar, R. A. (2018). Evaluating whether stories can promote social cognition: Introducing the Social Processes and Content Entrained by Narrative (SPaCEN) framework. Discourse Processes, 55(5-6), 454-479. https://doi.org/10.1080/0163853X.2018.1448209

Mar, R. A., Tackett, J. L., & Moore, C. (2010). Exposure to media and theory-of-mind development in preschoolers. Cognitive Development, 25(1), 69-78. https://doi.org/10.1016/j.cogdev.2009.11.002

McCrae, R. R. (1987). Creativity, divergent thinking, and openness to experience. Journal of Personality and Social Psychology, 52(6), 1258-1265. https://doi.org/10.1037/0022-3514.52.6.1258

McCrae, R. R., & Costa, P. T., Jr. (1997). Personality trait structure as a human universal. American Psychologist, 52(5), 509-516. https://doi.org/10.1037/0003- 066X.52.5.509

McCrae, R. R., & Costa, P. T. (2008). Empirical and theoretical status of the five-factor model of personality traits. The SAGE Handbook of Personality Theory and Assessment, 1, 273-294.

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex “frontal lobe” tasks: A latent variable analysis. Cognitive Psychology, 41(1), 49-100. https://doi.org/10.1006/cogp.1999.0734

Mumper, M. L., & Gerrig, R. J. (2017). Leisure reading and social cognition: A meta-analysis. Psychology of Aesthetics, Creativity, and the Arts, 11(1), 109. https://doi. org/10.1037/aca0000089

Nathanson, A. I. (2015). Media and the family: Reflections and future directions. Journal of Children and Media, 9(1), 133-139. https://doi.org/10.1080/ 17482798.2015.997145

Palmiero, M., Fusi, G., Crepaldi, M., Borsa, V. M., & Rusconi, M. L. (2022). Divergent thinking and the core executive functions: A state-of-the-art review. Cognitive Processing, 23(3), 341-366. https://doi.org/10.1007/s10339-022-01091-4

Panero, M. E., Weisberg, D. S., Black, J., Goldstein, T. R., Barnes, J. L., Brownell, H., & Winner, E. (2016). Does reading a single passage of literary fiction really improve theory of mind? An attempt at replication. Journal of Personality and Social Psychology, 111(5), Article e46. https://doi.org/10.1037/pspa0000064

Plucker, J. A., & Makel, M. C. (2010). Assessment of creativity. In J. C. Kaufman, & R. J. Sternberg (Eds.), The Cambridge handbook of creativity (pp. 48-74). Cambridge University Press.

Potter, R. F., & Bolls, P. (2012). Psychophysiological measurement and meaning: Cognitive and emotional processing of media. Routledge.

Rhodes, S. M., Stewart, T. M., & Kanevski, M. (2020). Immediate impact of fantastical television content on children’s executive functions. British Journal of Developmental Psychology, 38(2), 268-288. https://doi.org/10.1111/bjdp.12318

Riggs, W. (2018). Open-mindedness. The Routledge handbook of virtue epistemology (pp. 141-154). Routledge.

Samur, D., Tops, M., & Koole, S. L. (2018). Does a single session of reading literary fiction prime enhanced mentalising performance? Four replication experiments of Kidd and Castano (2013). Cognition and Emotion, 32(1), 130-144. https://doi.org/10.1080/02699931.2017.1279591

Schwerin, J., Lenhart, J., & Richter, T. (2025). Short-term effects of fiction on social-cognitive skills: The roles of literariness, language familiarity, and narrative experience. Scientific Study of Literature, 14(1), 4-22. https://doi.org/10.61645/ssol.191

Shiner, R. L. (1998). How shall we speak of children's personalities in middle childhood? A preliminary taxonomy. Psychological Bulletin, 124(3), 308-332.

Silberman, M. (2021). The work of the theater. In S. Brockmann (Ed.), Bertolt Brecht in context (pp. 115-122). Cambridge University Press. https://doi.org/10.1017/9781108608800.016.

Silvia, P. J. (2006). Exploring the psychology of interest. Oxford University Press.

Silvia, P. J., & Berg, C. (2011). Finding movies interesting: How appraisals and expertise influence the aesthetic experience of film. Empirical Studies of the Arts, 29(1), 73-88. https://doi.org/10.2190/EM.29.1.e

Smith, M. (2017). Film, art, and the third culture: A naturalized aesthetics of film. Oxford University Press.

Stanovich, K. E., & West, R. F. (1997). Reasoning independently of prior belief and individual differences in actively open-minded thinking. Journal of Educational Psychology, 89(2), 342. https://doi.org/10.1037/0022-0663.89.2.342

Storey, J. D. (2025). False discovery rate. International Encyclopedia of Statistical Science (pp. 944-949). Springer Berlin Heidelberg.

Strouse, G. A., O'Doherty, K., & Troseth, G. L. (2013). Effective coviewing: Preschoolers' learning from video after a dialogic questioning intervention. Developmental Psychology, 49(12), 2368. https://doi.org/10.1037/a0032463

Subbotsky, E., Hysted, C., & Jones, N. (2010). Watching films with magical content facilitates creativity in children. Perceptual and Motor Skills, 111(1), 261-277. https://doi.org/10.2466/04.09.11.PMS.111.4.261-277

Suggate, S. P. (2025). Does it kill the imagination dead? The effect of film versus reading on mental imagery. Psychology of Aesthetics, Creativity, and the Arts, 19(6), 1526-1538. https://doi.org/10.1037/aca0000651

Tan, C. S., Lau, X. S., Kung, Y. T., & Kailsan, R. A. L. (2019). Openness to experience enhances creativity: The mediating role of intrinsic motivation and the creative process engagement. The Journal of Creative Behavior, 53(1), 109-119. https://doi.org/10.1002/jocb.170

Thompson, E. R. (2008). Development and validation of an international English big-five mini-markers. Personality and Individual Differences, 45(6), 542-548. https://doi.org/10.1016/j.paid.2008.06.013

Torrance, E. P. (1975). Thinking creatively in action and movement: Administration, scoring, and norms manual. Department of Educational Psychology, the University of Georgia.

Valkenburg, P. M., & Van der Voort, T. H. (1994). Influence of TV on daydreaming and creative imagination: a review of research. Psychological Bulletin, 116(2), 316. https://doi.org/10.1037/0033-2909.116.2.316

van der Voort, T. H., & Valkenburg, P. M. (1994). Television' s impact on fantasy play: A review of research. Developmental Review, 14(1), 27-51. https://doi.org/10.1006/drev.1994.1002

Wellman, H. M. (2014). Making minds: How theory of mind develops. Oxford University Press.

Wimmer, L., Currie, G., Friend, S., & Ferguson, H. J. (2021). The effects of reading narrative fiction on social and moral cognition: Two experiments following a multi-method approach. Scientific Study of Literature, 11(2), 223-265. https://doi.org/10.1075/ssol.21010.wim

Wimmer, L., Currie, G., Friend, S., & Ferguson, H. J. (2022). Opening the closed mind? Effects of reading literary fiction on need for closure and creativity. Creativity Research Journal, 36(1), 24-41. https://doi.org/10.1080/10400419.2022.2087309

Wimmer, L., Currie, G., Friend, S., Wittwer, J., & Ferguson, H. J. (2024). Cognitive effects and correlates of reading fiction: Two preregistered multilevel meta-analyses. Journal of Experimental Psychology: General, 153(6), 1464. https://doi.org/10.1037/xge0001583

Wimmer, L., Messow, M., Oldach, A., Mebelli, F., & Lenhart, J. (2025). Imaginary worlds, real effects? Testing the effects of abstaining from narrative fiction on social cognition. Psychology of Aesthetics, Creativity, and the Arts. https://doi.org/10.1037/aca0000738

Winner, E., & Cooper, M. (2000). Mute those claims: No evidence (yet) for a causal link between arts study and academic achievement. Journal of Aesthetic Education, 34(3/4), 11-75. https://doi.org/10.2307/3333637

Yang, X., Chen, Z., Wang, Z., & Zhu, L. (2017). The relations between television exposure and executive function in Chinese preschoolers: The moderated role of parental mediation behaviors. Frontiers in Psychology, 8, 1833. https://doi.org/10.3389/fpsyg.2017.01833

Table 1

Descriptive statistics (mean and standard deviations in parenthesis) and output of the statistical models for each measure and condition.

	Control (No film)	Single perspective film	Multiple perspectives film	Control vs Film	Single vs Multiple
Assessment tasks					
Creativity (Alternative uses test)	29.73 (5.87)	26.95 (4.74)	26.12 (6.00)	*Est* = 3.048, SE = 0.96, *t* = 3.17** 95% CI: [1.15, 4.95]	*Est* = 0.908, SE = 1.11, *t* = 0.82 95% CI: [-1.28, 3.10]
Imaginability (Experiential index)	29.07 (8.54)	27.91 (8.36)	30.07 (7.82)	*Est* = -0.115, SE = 1.42, *t* = -0.08 95% CI: [-2.92, 2.69]	*Est* = -2.279, SE = 1.63, *t* = -1.39 95% CI: [-5.51, 0.95]
Openness to new evidence (Hypothesis-testing task)	0.11 (0.30)	0.08 (0.35)	0.05 (0.25)	*Est* = 0.005, SE = 0.01, *t* = 0.91 95% CI: [-0.01, 0.01]	*Est* = 0.003, SE = 0.01, *t* = 0.56 95% CI: [-0.01, 0.01]
Cognitive flexibility (Wisconsin card sorting task)	4.08 (3.20)	4.98 (3.89)	3.88 (2.99)	*Est* = -0.020, SE = 0.04, *t* = -0.49 95% CI: [-0.10, 0.06]	*Est* = 0.074, SE = 0.05, *t* = 1.58 95% CI: [-0.02, 0.17]
Baseline measures					
Openness to experience (Big-five mini-markers)	32.78 (4.16)	32.98 (4.08)	32.44 (3.13)	*Est* = 0.01, SE = 0.02, *t* = 0.10 95% CI: [-0.04, 0.04]	*Est* = 0.02, SE = 0.02, *t* = 0.71 95% CI: [-0.03, 0.06]
Film and TV expertise (index)	0.12 (0.70)	-0.03 (0.85)	-0.09 (0.61)	*Est* = 0.017, SE = 0.01, *t* = 1.38 95% CI: [-0.01, 0.04]	*Est* = 0.006, SE = 0.01, *t* = 0.40 95% CI: [-0.02, 0.03]
Real-time measures					
Pupil diameter		-6.50 (9.72)	-0.89 (28.68)	-	*Est* = -0.061, SE = 0.04, *t* = -1.39 95% CI: [-0.15, 0.02]
Number of fixations		17.38 (77.57)	9.54 (83.95)	-	*Est* = 0.049, SE = 0.07, *t* = 0.71 95% CI: [-0.09, 0.19]
Heart rate		0.50 (5.44)	1.93 (3.98)	-	*Est* = -0.014, SE = 0.01, *t* = -1.54 95% CI: [-0.03, 0.00]
Skin conductance		14.76 (25.59)	38.83 (48.37)	-	*Est* = -0.110, SE = 0.03, *t* = -3.28** 95% CI: [-0.18, −0.04]

Note. This table presents the means and standard deviations (shown in parentheses) for each main variable by condition. ** $p < .01$

Figure 1

Schematic representation of the structure of the film excerpts. Note. The single-perspective film clip is illustrated in the top panel, and the multiple-perspectives film clip is illustrated in the bottom panel. Scenes outlined with a bold border indicate those that were identical across both film conditions.

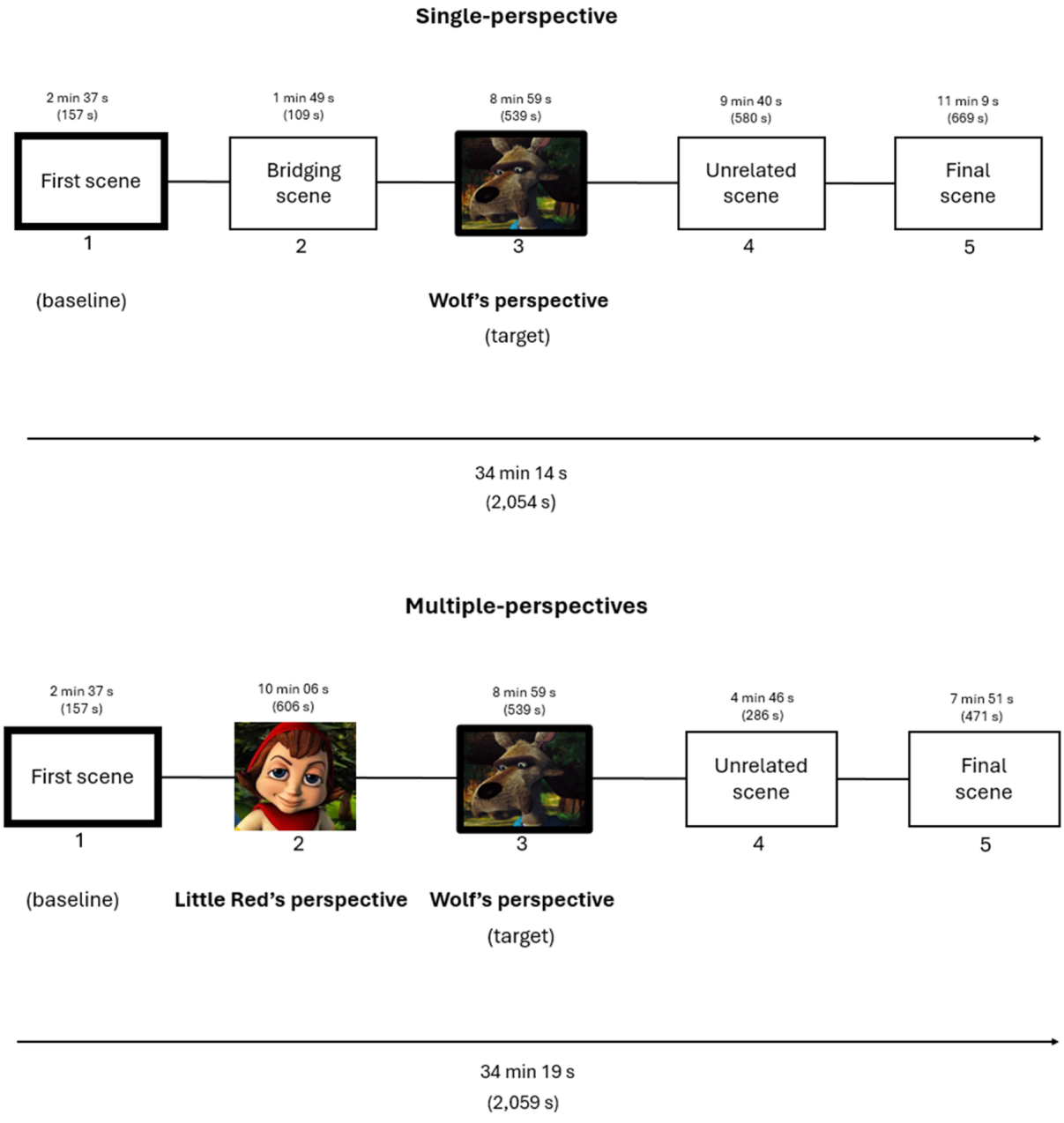


Figure 2

Effect of condition on each of the four open-mindedness assessment tasks. Note. Control refers to the no-film condition; Multiple refers to the multiple-perspective film condition; Single refers to the single-perspective film condition. Each plot displays raw data points, a horizontal line indicating the mean, and a shaded rectangle representing the 95% confidence intervals around the mean. Arrows indicate the direction of open-mindedness for each measure: higher scores on creativity and imaginability reflect greater open-mindedness (upward arrow), whereas lower scores on openness to new evidence and cognitive flexibility indicate greater open-mindedness (downward arrow).

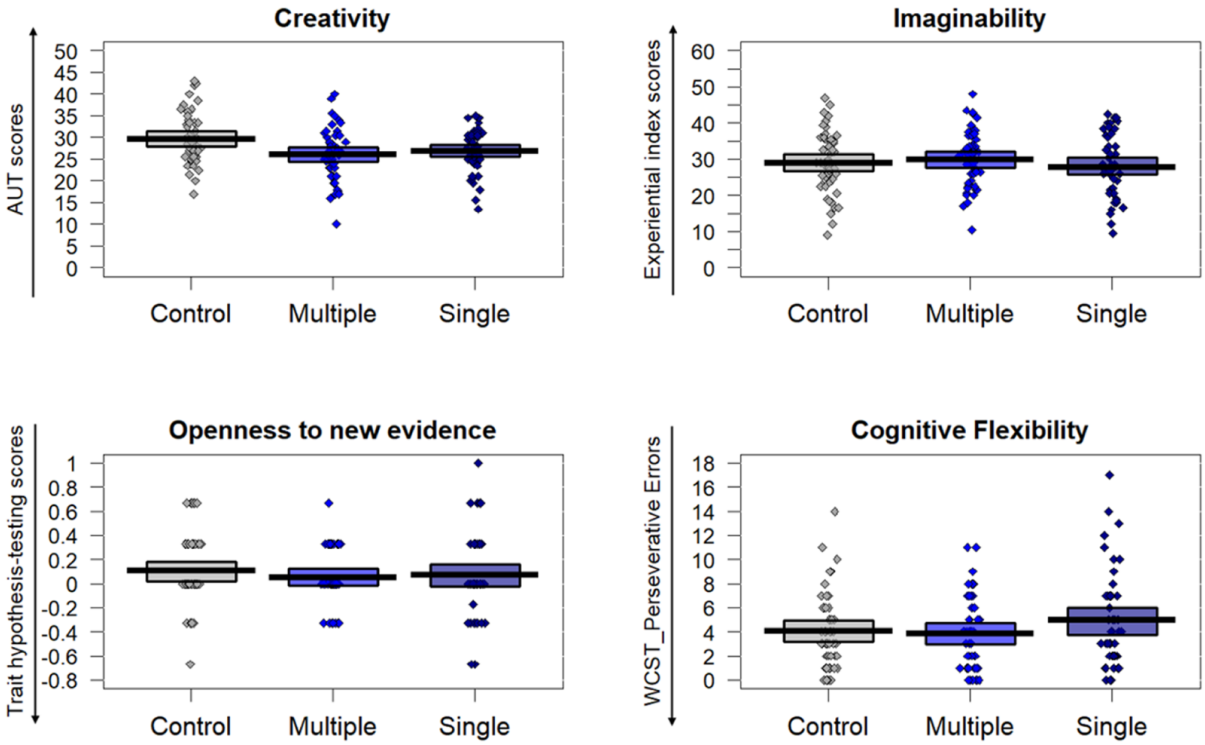


Figure 3

Effects of condition on each of the four online measures. Note. Multiple refers to the multiple-perspective film condition; Single refers to the single-perspective film condition. Each plot displays raw data points, a horizontal line indicating the mean, and a shaded rectangle representing the 95% confidence intervals around the mean. The red horizontal line marks the zero value.

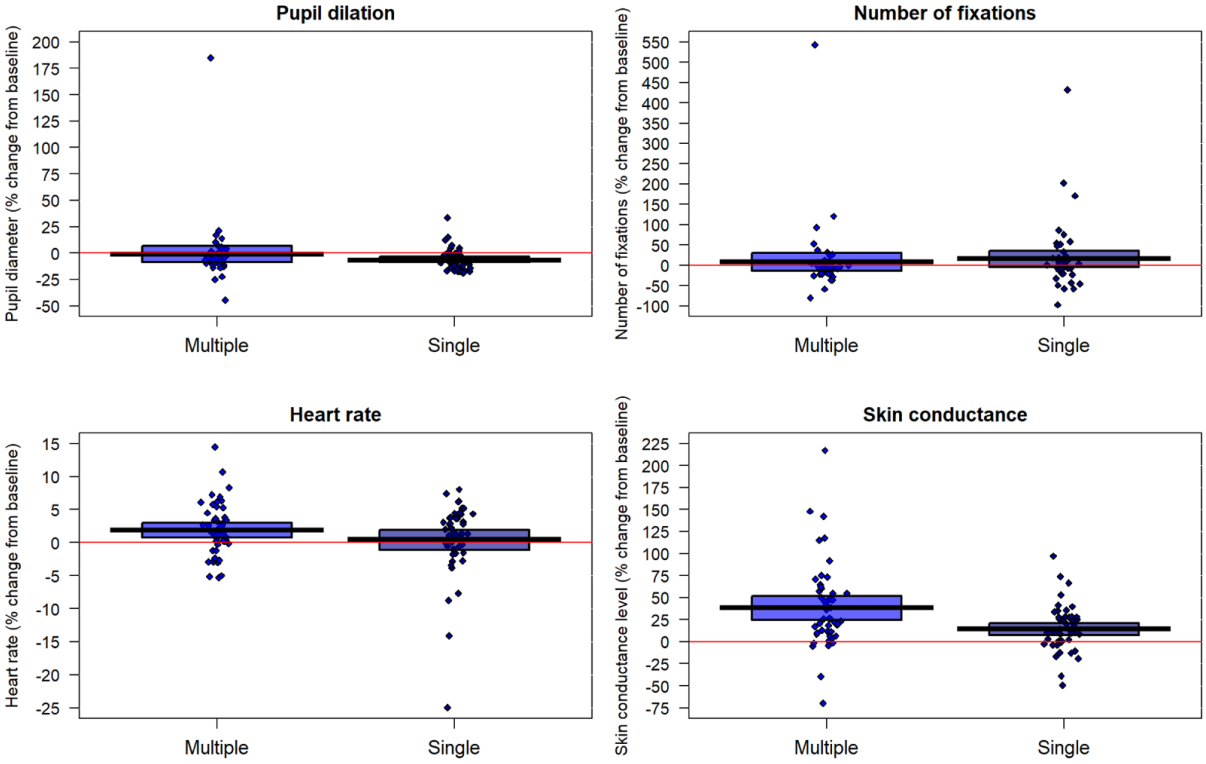


Figure 4

Correlation matrix between variables. Note. Values represent Kendall's tau-b correlation coefficients. Red-shaded cells indicate positive correlations and blue-shaded cells indicate negative correlations; darker hues indicate stronger associations.

