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Getting Lost in Film: Dissociation and Time Perception during film viewing

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Introduction

The exploration of dissociative experiences

The Diagnostic and Statistical Manual of Mental Disorders (2014) describes dissociative disorders as a disruption of consciousness, memory, identity, emotion, perception, body representation, motor control and behaviour. It distinguishes the three major dissociative conditions: Dissociative Amnesia, Depersonalisation/Derealisation and Dissociative Identity Disorder. Additionally, many other clinical conditions such as posttraumatic stress disorder (PTSD) or borderline personality disorder (BPD) include dissociative phenomena in their description of common symptoms (American Psychiatric Association, 2014). Research suggests, that not only in clinical patients but also in the general population, dissociative experiences might be more common than originally assumed. Different studies have found that around 3-8% of the general population reported pathological dissociative symptoms but the amount of individuals without pathological symptoms that are nevertheless negatively affected by maladaptive amounts of dissociation, might be even higher (Simeon & Putnam, 2022; Waller & Ross, 1997). As for pathological dissociation, different neurophysiological and genetic correlates have been found, like a volume reduction in the basal ganglia, hippocampus and thalamus. Findings that still need more research to be accounted as sufficient biomarkers are greater levels in oxytocin and prolactin as well as lesser amounts of tumour necrosis factor alpha. Similar correlates might be relevant for non-pathological maladaptive dissociative experiences as well, but more research is needed for that to be confirmed (Lynn et al., 2022).

Dissociation therefore is a psychological facet of high scientific interest, with different types of research fields exploring not only the aetiology or risk factors, but also possible ways to help individuals struggling with maladaptive amounts of dissociation. Nevertheless, there is still a lack of accessible interventions that can be implemented into the everyday life of the affected people. This thesis focusses on finding a new method to lower maladaptive amounts of dissociation via combining the soothing impacts of natural environments with cinematherapy. As will be described in more detail in the following chapter, research has shown that especially blue and green spaces can lower stress and foster mental-well-being (e.g. White et al., 2021). This positive impact can be important for people with different clinical diagnoses as well as non-clinical individuals and highlights that everyone can benefit from natural environments (e.g. Mizumoto et al., 2024). But simply going outside cannot be possible for everyone and at any time. Luckily, studies have shown that this benefit can also be found in illustrations of natural environments like virtual reality and movies (Anderson et al., 2017). As film is a tool that has a long history of being implemented into the process of psychotherapy via diffe-

rent forms, it has already shown large potential in the field of mental health interventions (Hamilton, 2024). Additionally, movies are easily accessible to a big variety of people, independent of their resources and personal journey. One movie type that often portraits natural environments and habitants are documentaries, but for now they have mostly been used as an informational tool in this research field (e.g. Goodwin et al., 2021). The two domains of nature and cinematherapy have not yet been combined in the context of dissociative experiences which leaves a research gap in the search for more accessible mental-health interventions that are easily available for everyone struggling with maladaptive amounts of dissociative experiences. This study combines the positive impacts of nature and movies on mental health, by focussing on the aesthetic elements of nature-based documentary scenes. It takes a closer look into this type of low intensity mental health intervention by studying the positive impact on a non-clinical sample.

The purpose of this study

This study explored the effect of nature-based documentary scenes on dissociation by presenting different types of nature- and human-centred film clips as well as different types of questionnaires on state- and trait dissociation and stress. For a more objective measurement this study also included time estimation as an additional measurement of dissociative experiences in form of the distortion on the passage of time.

This thesis starts with a review of recent studies on dissociation, cinematherapy and nature-based interventions and then combines these three aspects and argues why this is an important combination with more exploration needed, including the research aims and hypothesis of the study. I then state the general procedure that was done and explain the different stimuli and questionnaires that were used in detail. This is followed by the results section, where I discuss the findings of my research, whether my hypotheses were significant and other exploratory analyses that were conducted. The discussion summarises these findings, combines them with recent literature, proposes possible interpretations and states future research as well as the limitations of the current study. The abstract in English as well as German can be found in the appendix, summarising the findings of this study shortly.

Review

Models and theories of dissociation

Aetiology

There are different models regarding the causes of dissociative experiences. Most prominently are the (post-) traumatic model (Janet, 1894) and the socio-cognitive model (Lilienfeld et al., 1999). The former highlights the direct role of trauma in the development of dissociative symptoms, proposing that there is a relationship between dissociative experiences and different forms of trauma but especially childhood maltreatment in the early years of life. The dissociative symptoms therefore normally result from maladaptive coping mechanisms in the fight against intolerable adverse memories and associated negative feelings, to enhance the survival during and after the traumatic event or multiple experiences of trauma. Some theories go even further and propose that posttraumatic stress disorders and dissociative disorders are closely related and advice that the two of them should be researched together instead of separately (e.g. Waller & Ross, 1997). Despise this, some recent studies did not find the necessity of an association between PTSD and self-reported dissociative symptoms (Simeon & Putnam, 2022). The socio-cognitive model uses a multifactorial framework that focusses on a broad spectrum of social, cognitive and cultural variables that influence the development of dissociative disorders and therefore opposes the core premises of the traumatic model, proposing that trauma is not the exclusive and necessary potential origin of dissociative experiences. Possible determinants that the socio-cognitive model names are the influences of popular media or psychotherapy, that lead to a narrative of multiple selves to cope with negative experiences (Lynn et al., 2022). It's important to highlight that both models have been criticised in the scientific community for diverse reasons and there is still a lot of controversy surrounding the aetiology but also the classification of dissociative experiences (Lynn et al., 2022).

Dimensional Approach

Apart from psychopathological and categorial approaches to the phenomena of dissociation, other literature suggests a dimensional understanding by conceptualising this mental construct as a psychological dimension across the general population (e.g. Putnam et al., 1993). On this spectrum, milder scores represent a more adaptive amount of dissociation like healthy absorption or harmless daydreaming. Higher amounts of dissociation, on the other hand, can be trauma related and in general influence the mental wellbeing and therefore be psychopathological relevant. This continual approach highlights the relevance for studies investigating not only study subjects that are already diagnosed and getting treatment for a dis-

sociative disorder but also focus on the general population as a whole and target a better understanding of this facet as a spectrum.

Components of dissociation

Dissociation in general can be understood as a phenomena that manifests as experiences of amnesia, depersonalization, derealisation and absorption (Maaranen et al., 2005).

Dissociative amnesia refers to an inaccessibility of autobiographic memories, especially those with traumatic or stressful causes. Generally speaking, it is understood as a loss of memory about experiences that happened during a dissociative episode. It's important to mention, that dissociative amnesia as a mental disorder is a highly discussed phenomena with many controversies in current research due to an uprising of studies that found the contrary result, that traumatic experiences are generally remembered quite well (Mangiulli et al., 2021).

Depersonalisation can be understood as a feeling of detachment and alienation from Oneself, like encountering out-of-body experiences. Derealisation on the other hand, is the same phenomena regarding the individuals surroundings, for example when other people don't seem real. Besides being phenomena that often appear due to traumatic experiences and stress, they can also be triggered by other events like substance misuse, sleep- or sensory deprivation (Michal et al., 2004).

And lastly dissociative absorption describes a tendency for one's awareness to become absorbed in internal or external stimuli to a point of being oblivious to one's surroundings. This stimuli often happens to be one's imagination where individuals find themselves totally immersed in their thoughts and experience confusion with reality (Soffer-Dudek, 2019).

If seen as a phenomenon everybody experiences in different degrees, dissociation can also be divided into trait and state variables. Trait dissociation refers to relatively stable individual differences in dissociative experiences, which are consistent over time and different situations. State dissociation on the other hand, describes a more temporary change in dissociative symptoms that are triggered by a specific event (Krause-Utz et al., 2021).

The limited knowledge on dissociation highlights the importance of more research exploring not only the source of dissociation but also possible interventions that can reach all people suffering from unhealthy amounts of dissociation and is easily accessible independently of one's mental health journey. This thesis focusses on finding new methods to lower maladaptive amounts of dissociation via easily accessible tools everybody can use in their everyday life.

Cinematherapy

Cinematherapy is broadly understood as a branch of art therapy, that uses the power of different types of movies to elicit emotional responses, foster self-reflection and catalyse psychological healing. It is part of a long therapeutic tradition of working with images, symbolism and story. This process can include the therapist selecting a movie that the client is supposed to watch alone or with others in order to stabilize mental health issues but can also be selected by the client to demonstrate a movie or character they might relate to. Additionally, cinematherapy can be used in form of self-help, as they are an easily accessible tool that offers a timeout from the stress of everyday life and gives the opportunity to engage with different worlds and new perspectives. Movies can resemble the own life story through a distanced lens which can make experiences feel less intimidating than facing them in real life. But visual material can also be used to teach life skills in form of observational learning (Hamilton, 2024). Various advantages of this method can be named, like the compliance is normally higher with movies, videos are inexpensive and this method doesn't take a lot of time away from other duties. Tolfree (2016) found that movie therapy reduced parent-adolescent conflicts in school counselling, and increased empathy, communication skills and interpersonal learning. Evidence demonstrates that video treatments can be used in different forms and also at different parts of the therapeutic process and mental health journey. For example, movies can help patients suffering from specific mental disorders get new perspectives on their life with the illness or raise awarenesses about unhealthy behavioural patterns. Tolfree (2016) also found in their study that discussing superhero movies helped young people diagnosed with schizophrenia to reconceptualise their stories and see new possibilities for their future. One concept for implementing movies into the therapeutic process is the MOVIE model, that suggests 5 reflective steps and integrates mindfulness, experimental therapy and narrative therapy, that can be viewed in Table 1(Hamilton, 2024). There are different concepts available for implementing movies in the therapeutic process for variable parts of therapy.

However, as movies are a popular medium with easy availability, they have the potential to also reach people without a clinical diagnosis that still suffer from mental health issues without getting treatment (yet). Identifying the positive effects of film on various aspects of mental health can yield actionable knowledge for the development of therapeutic applications, while also holding potential value for enhancing well-being in the broader population.

Table 1
5 reflective steps of the MOVIE method

Mindful engagement	The individual should start by paying attention to their thoughts, feelings and somatic sensations during the movie experience but also the discussion in therapy.
Observing responses	The responses to the visual material should be noticed without judgement and trauma-informed techniques can be added if appropriate
Voice	Voicing what was experienced during the movie in form of talking about it in therapy, writing it down or exploring it in other creative ways.
Identify	Connect the things portrayed in the movie (e.g. characters, narrative) to the individual experiences, to work out the personal meaning.
Explore	Using the experience for potential growth: re-authoring the personal story, developing new coping-strategies or gaining motivation to move forward.

Nature-based interventions

Natural settings that are rich in environmental elements such as forests, water and flora are known to foster mental well-being, physiological relaxation and reduce stress. They can operate as restorative environments, that facilitate from mental fatigue and exhaustion. This phenomenon has high potential as the basis of grounding interventions for both the general population as well as clinical patients and different theories try to explain why natural settings have such a calming effect on humans (Han & Sabran, 2025). The Biophilia Hypothesis for example argues, that we have an innate connection to nature which explains this restorative affects (Wilson, 1986). Especially green (e.g. parks, forests) and blue spaces (e.g. rivers, the sea) often get highlighted in this research field and show a positive impact on mental health (e.g. Pouso et al., 2021; White et al., 2021). All this knowledge is already implemented in dif-

ferent forms of nature-based interventions such as forest therapy or horticultural therapy, as an alternative to psychopharmacological treatments (Mizumoto et al., 2024). However, for diverse reasons, simply going outdoors to enjoy nature in real life cannot be possible for everyone and at any time. It is therefore important to research ways that could help replicating the positive effects of outdoor nature, while being indoors. (Anderson et al., 2017). That's where modern technology can come in handy, because growing evidence shows, that this effect is not only limited to real life nature but also well founded in Illustrations of nature like virtual reality or film, with a superiority of videos over static images. This form of natural environment can have the same influence on the mental well-being and therefore has the potential as low intensity intervention for several mental disorders (Benz et al., 2022; Riches et al., 2023). Mizumoto et al. (2024) found that participants suffering from depressive and anxiety disorders reported enhanced mood after watching a 3-minute-long video of green natural settings. More nature-based studies are therefore needed that measure the effects of virtual nature experiences instead of real life nature also because it's easier to implement and standardize than outdoor settings (Benz et al., 2022). Several studies already investigated the effect of Virtual Reality nature-based scenes on different mental health factors and found promising results (e.g. Anderson et al., 2017; Riches et al., 2023).

The overlap of dissociation and nature-based film-intervention

Given that various cinematic genres feature natural landscapes, they may offer a unique opportunity to combine the beneficial effects of cinematic experiences and the well-documented restorative effects of nature. One movie genre that often focusses on natural environments are documentaries, but for now, they have mostly been used for educational purposes in mental-health research (e.g. Goodwin et al., 2021). This study takes a different approach and focusses on the visual aesthetics of documentaries instead of using them as an informational tool by combining both nature- and film-based methods to study the effect on dissociative experiences in a non-clinical sample. As some of the symptoms of maladaptive dissociation are a disruption in attentional control and embodied awareness, nature-based visual stimuli could potentially counteract these tendencies by gently reorientating attention to one's surroundings and shift negative dissociative experiences towards more adaptive forms of absorption, that ground the individuals. This is a current research gap in the field of possible mental health interventions, as the blend of these three aspects has not yet been studied in this line of research but has tremendous potential.

Questions and research aim

Dissociation can be characterised as a psychological construct on a spectrum. Milder forms can be seen as not significantly interfering with adaptation, as on the other hand, higher amounts can negatively affect the individuals mental health and functioning in society (Cavicchioli et al., 2021). It is therefore important to investigate potential interventions and make them more accessible to everyone struggling with negative amounts of dissociation, whether they are already diagnosed with a psychological disorder and getting treatment or not.

Many types of movies that we are often confronted with in everyday life use the dissociative experience as an aesthetic tool, especially derealization. They want the viewers to lose track of time and their surroundings, to reinforce the absorption into the presented narrative and maximise the movie experience (Butler & Palesh, 2004; Kovarski et al., 2022). Studies on the effect of movies on mental health often focus on negative emotional responses to traumatic visual material and/or let the participants complete different types of tasks during the movie experience (e.g. Droit-Volet et al., 2011). Danböck et al. (2025) for example researched the dissociative experiences during 30s film scenes and found that some types of methods like hypnotic suggestion and spiral-staring can induce dissociation during the visual experience. All these findings aside, there's still a lack of positive interventions for people with different mental health struggles, including those with maladaptive amounts of dissociative experiences. So apart from negative findings on dissociation inducing effects that have been found, on the other hand, specific types of movies have shown to have soothing consequences on the mind and can help ground especially individuals struggling with their mental health (Anderson et al., 2017). Movies portraying calm, natural environments could have the potential as low intensity interventions for the struggling individuals. Movies in general are therefore a medium that needs further exploration when it comes to the positive and negative effects on people struggling with unhealthy amounts of dissociation.

This study takes a closer look into the positive aspects of nature-based movie scenes, by comparing them with human-based movie scenes. The effect depending on the trait dissociation is measured via a set of questions as well as the time perception accuracy and the state dissociation are employed via a self-report questionnaire. The aims of the study can be summarised like following:

Are there differences in time perception accuracy based on the trait dissociation?

Do individuals with higher amounts of trait dissociation struggle more with predicting how long a movie scene was? Dissociative phenomena have been linked to two different types of time distortion. One, temporal perspective, describes the larger continuum of time and involves past, present and future. The other, time perception, that this research question focusses on, refers to the rate of passage and distortion of time in a shorter matter. Studies in this research field found that people affected by unhealthy amounts of dissociation report altered sensations of passing time when it comes to the perceived duration among some other aspects (Ferroni et al., 2025). This distortion can involve the experience of time passing slower, faster or like it stands still and can be measured subjectively or objectively (Simeon et al., 2007). This study takes a closer look on the specific impact when it comes to movie scenes, by letting the individuals guess the time of the presented clip and estimating the objective time perception accuracy. It therefore tackles the question if trait dissociation is associated with the time perception accuracy.

Are there differences in time perception accuracy based on the movie type?

Does the struggle described in the research question above differ based on what movie scene was viewed? As already discussed, natural elements were found to have soothing and grounding effects especially on people struggling with their mental health, which can be transferred to nature-based movie scenes (Anderson et al., 2017). By comparing nature- with human-based documentaries this study aims to find out whether objectively measured dissociation gets lower when viewing natural environments instead of human-centred video clips, which gets measured via time perception accuracy. This study looks further into the specific impact on individuals with different amounts of dissociation and tackles the question if nature-based movies can neutralize the distorted perception of time caused by unhealthy amounts of depersonalisation.

Are there differences in state dissociation based on the viewed movie type?

This study also wants to investigate if nature-based movie scenes have an influence on the state dissociation that individuals experience right after watching the movie clip. There are currently no recent studies that explore the impact on state-dissociation, but the general soothing effect of natural elements and nature illustrations shows promising results that these could also be used to lower acute dissociative experiences and ground the viewing person (Anderson et al., 2017). Therefore, considering this research gap, the direct effect specific movies have on dissociation in the moments after seeing the visual material is also included in

this study, to maximise the exploration of the complex connection between movies and dissociation.

Method

Participants

The software program G*Power was used to conduct a power analysis beforehand. The goal was to obtain .80 power to detect a medium size effect of .50 at the standard .05 alpha error probability. The highest one for the different tests suggested a total *N* of 84 (H1 = *N* of 84; H2/H3 total *N* of 34). Altogether 120 participants were gathered for this study, the overcollection was calculated to address for dropouts and unusable data.

Only individuals above 18 years were included in the study. The main recruitment process took place via the Faculty of Psychology: Laboratory Administration for Behavioural Sciences (LABS) website, where mostly other psychology students are recruited while gaining ECTs points for their Bachelors. Depending on the span of the study the students participate in, they gain different amounts of credits, while a specific number of credits is needed to successfully complete the course and gain ECTs points. They get one Credit for every 15 Minutes. This study was 45 minutes long and the students therefore gained 3 Credits for their participation. About 10 of the participants were contacted directly to participate in the study, all other 110 were recruited via the LABS system. All participants visited the faculty of psychology and completed the study in a designated test room in the 1st district of Vienna where a maximum of four people participated simultaneously. Altogether 120 people took part in the study, but only 99 reported their age which resulted in a mean age of 22.4 years (min 18, max 61).

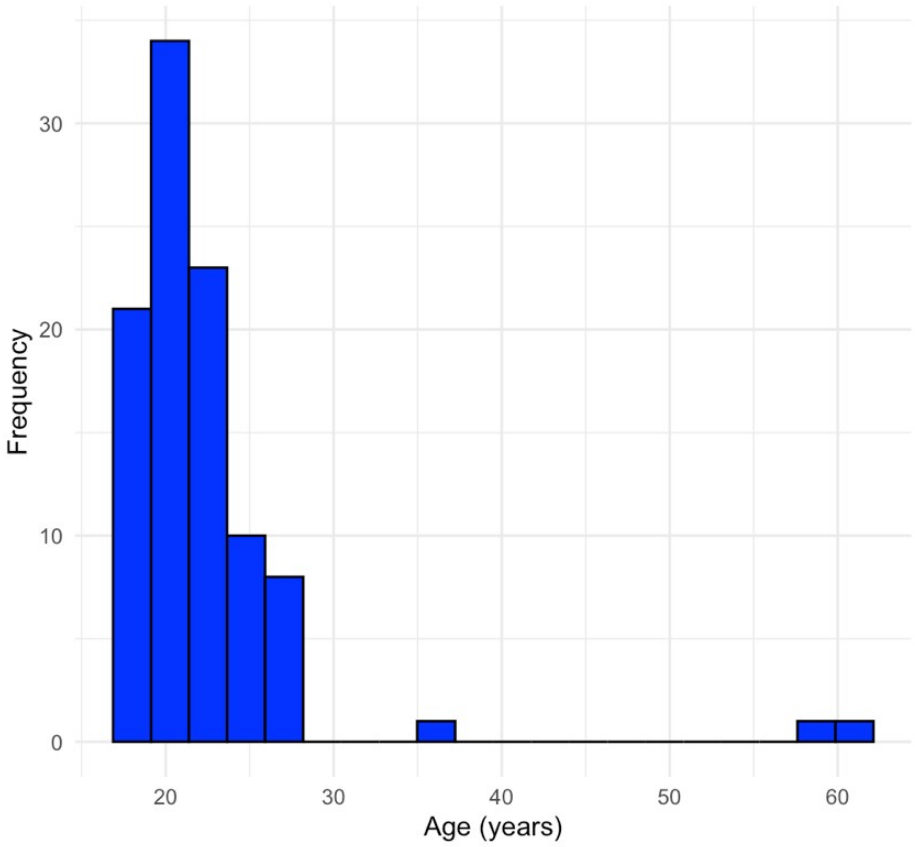

Figure 1
Age distribution of the participants

General procedure of this study

At the beginning of the study, all participants read an introduction where the purpose, the sequence, risks, benefits and voluntariness of the study was explained. Participants also got the information that they can stop the participation at any time without facing consequences and contact details of the researcher in case there were any questions. The introduction also included a declaration of consent that all participants had to agree to in order for the study to begin. In this declaration the individuals approved that they were over 18 years old, had enough time to make the decision to participate and had no open questions, while also consenting for their data to be saved and analysed. The researcher was present during the whole study, in case any questions arose or there were technical difficulties.

After this declaration of consent, the participants were asked to state their age, wakefulness and stress-level at the beginning of the study. All participants had to answerer the items of the *Fragebogen zu dissociativen Symptome* (FDS), where trait dissociation was surveyed. Next, they were confronted with the first 7.41-minute-long movie clip that was either nature- or human-based and had to estimate the perceived time length after the movie experi-

ence as well as answer the *Dissoziations-Spannungs-Skala-4-akut* and rate their current stress-level. The same procedure then followed with the second 7.41-minute-long video. After that, all participants viewed 10 smaller movie clips that originated from different nature- and human-based documentaries than the ones previously viewed. After every scene, the study subjects once again estimated the time duration of that clip. At the end, the individuals had to rate their general interest in the presented movie scenes as well as how emotional they think these were. On the last page of the study, the participants were thanked for their participation and informed that they should get in touch with the researcher. A detailed overview of the exact procedure can be found in Table 4.

Table 2
Exact order of this study.

Page	Content	Format	Specifics
1	Information and declaration of consent	Reading and selecting that they agree	"Ich stimme zu"
2	Age, Wakefulness and Stress	Age was answered in an open format, Wakefulness and Stress were answered on a slider	"Wie alt sind Sie?"; "Wie ausgeschlafen fühlen Sie sich?"; Wie gestresst fühlen Sie sich?"
3	FDS to measure trait-dissociation	Scale from 0% to 100% in increments of 10, so scale from 1 to 11 based on how often the statements apply in their lives	See Table 3
4	DSS-4-akut to measure state-dissociation before watching any videos	Scale from 1 "gar nicht" to 9 "sehr stark" on how well the statements apply to one in this moment	See Table 4
5	Information that the videos will be presented without audio and the participants should watch them carefully.	Reading and turn to the next page	"Bitte betrachten Sie die folgenden Videos mit voller Aufmerksamkeit und beachten Sie, dass diese ohne Ton abgespielt werden."

6	First 7.41-minute-long video	Just watching	Either nature-based video or human-based scene
7	Time estimation	Open Format	“Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?”
8	DSS-4-akut to measure state-dissociation after watching the first video	Scale from 1 “gar nicht” to 9 “sehr stark” on how well the statements apply to one in this moment	See Table 4
9	Stress-Item	Slider from no stress at all “gar kein Stress” to extremely high stress “extrem hoher Stress”.	“Wie gestresst fühlen Sie sich im Moment”
10	Second 7.41-minute-long video	Just watching	Either nature-based video or human-based scene
11	Time estimation	Open Format	“Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?”
12	DSS-4-akut to measure state-dissociation after watching the second video	Scale from 1 “gar nicht” to 9 “sehr stark” on how well the statements apply to one in this moment	See Table 4
13	Stress-Item	Slider from no stress at all “gar kein Stress” to extremely high stress “extrem hoher Stress”.	“Wie gestresst fühlen Sie sich im Moment”
14	First smaller video: backing	Just watching	0.35 minutes long, human-based
15	Time estimation	Open Format	“Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?”

16	Second smaller video: eagle	Just watching	2.05 minutes long, nature-based
17	Time estimation	Open Format	"Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?"
18	Third smaller video: lynx	Just watching	0.33 minutes long, nature-based
19	Time estimation	Open Format	"Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?"
20	Fourth smaller video: drawing	Just watching	0.58 minutes long, human-based
21	Time estimation	Open Format	"Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?"
22	Fifth smaller video: sea	Just watching	1.31 minutes long, nature-based
23	Time estimation	Open Format	"Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?"
24	Sixth smaller video: tailoring	Just watching	2.03 minutes long, human-based
25	Time estimation	Open Format	"Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?"
26	Seventh smaller video: deer	Just watching	0.21 minutes long, nature-based
27	Time estimation	Open Format	"Wie viele Minuten und Sekunden hat die Filmsze-

			ne Ihrer Einschätzung nach gedauert?"
28	Eighth smaller video: rings	Just watching	1.23 minutes long, human-based
29	Time estimation	Open Format	"Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?"
30	Nineth smaller video: make-up	Just watching	0.21 minutes long, human-based
31	Time estimation	Open Format	"Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?"
32	10th smaller video: forest	Just watching	1.02 minutes long, nature-based
33	Time estimation	Open Format	"Wie viele Minuten und Sekunden hat die Filmszene Ihrer Einschätzung nach gedauert?"
34	Emotionality and Interest	Scale from 1 not at all "gar nicht" to 5 very "sehr"	"Wie emotional empfanden Sie die gezeigten Filmausschnitte?", "Wie interessant fanden Sie die gezeigten Filmausschnitte?"
35	End with thank you and that they must tell the researcher they finished		

Visual Stimuli

The participants were confronted with two different 7.41-minute-long movie scenes that were presented to them in the first part of the study. Half of the participants watched the nature-based video first (Group: NH) and the other one saw the human-based video in the be-

ginning (Group: HN), which was accomplished by using two separate links that were presented alternately. As already discussed, recent literature often included tasks or questionnaires that participants had to complete during the film experience itself. Studies of this kind used different lengths of movie scenes ranging from over 30 minutes to only 7.5 minutes and were regardless of the time frame able to report elevated dissociation in the study subjects (e.g. Danböck et al., 2021; Holmes et al., 2006; Kindt & Van Den Hout, 2003). Research in this field therefore suggests no specific length a movie scene needs to be, to induce dissociation and also shows no strong evidence that longer movie scenes are more likely to cause dissociative states than shorter ones. It's important to note, that most of these studies used disturbing and emotionally stressful film material to induce dissociation. The current study used more neutral types of movies, to test the positive effects of nature-based movie scenes on dissociative experiences, but due to a lack of similar studies, the applied film length orients on the described literature.

Another set of altogether 10 video-clips ranging from 2.05 to 0.21 minutes was included in the second part of the study. These videos showcased clips from diverse nature- as well as human-based documentaries that differed from the ones the participants have already seen in the first part of the study. This section of the study was presented to all participants in the same order: Backing, Eagle, Lynx, Drawing, Sea, Tailoring, Deer, Rings, Make-up and Forest. This supplementary measure was included to ensure that effects on perceived duration were not specific to the two main experimental videos but can be generalized across different types of stimuli of this kind. Moreover, the inclusion of multiple short clips at the end of this study allowed the examination of time perception across varying time frames, providing a more robust test of the stability of the observed effects.

To assure comparability, all movie scenes were muted and presented without any audio file. This also minimized potential confounding effects of auditory information on dissociation and subjective time perception, ensuring that observed effects can be attributed primarily to visual exposure.

Nature-based movie scenes

The main experimental nature-based movie scene was drawn from the documentary Giants of the Big Blue Sea (Disney+, 2018). The selected 7.41-minute-long clip showed a few over water scenes, but the main focus was under water views displaying the behaviour of different adult and child whales in their natural habitat. The whales were displayed swimming around in a herd, nurturing their babies and sleeping on the bottom of the ocean. There were

also some point-of-view scenes included, that were filmed from the back of a whale so one can immerge into the scene by feeling like one of the animals.

For this category it was important that the chosen film did not include any humans, no man-made objects as well as no narrative. Due to the film scenes being muted, there was also no voice-over guiding and storyline portrayed in the presented scene. The nature-based movie scene therefore is purely observational, allowing participants to engage solely with natural elements free of humans or artificial intervention.

Human-based movie scene

The main experimental human-based film stimulus consisted of a segment from the SWR documentary series Handwerkskunst, specifically an episode showcasing the process of creating a traditional mosaic piece. This scene was also cut to be 7.41 minutes long. The excerpt focused on the manual craftsmanship involved: individual stone and glass pieces were cut, shaped, and arranged according to a predefined pattern, and then carefully placed onto a supporting mesh. The visual emphasis is on hands, tools, materials, and the gradual emergence of the mosaic. Although the craftswoman occasionally appears speaking to the camera, the audio track was removed for the experiment, ensuring that no verbal information or narrative content influenced participants' responses.

This film scene served as a comparison to the nature-based 7.41-minute-long clip and care was taken to ensure, that from an aesthetic point of view, both documentaries were generally similar, with similar cuts, flow and calmness of the images. The main difference to the nature-based movie scene was that it displayed a human in an unnatural environment making an artificial object by hand. It therefore took on a human focus displaying man-made items, instead of nature and its habitants.

Shorter movie scenes

The additional movie scenes at the second part of the study ranged from 2.05 to 0.21 minutes and can also be divided into nature- and human-based clips. As the main experimental nature-based movie scene, the 5 shorter ones also included no humans and focused simply on wildlife and outdoors. Ranging from shortest to longest this category included a 0.21 minutes long scene from "Unser Wild- Reh und Hirsch" portraying deer on a field, a 0.33 minutes long clip from "Wildes Deutschland – Der bayrische Wald" showcasing a lynx walking in a forest, a 1.02 minutes long sequence from "Unsere Berge im Wandel – Die Mittelgebirge" where trees and a small pond were presented. From "Die traumhafte Unterwasserwelt der Ba-

hamas" a 1.31-minute-long clip showed marine life and a 2.05-minute-long sequence from "Bartgeier – Die Knochenfresser kommen" displayed eagles flying over mountains. The other 5 movie scenes from this part of the study can be summarized into the human-based category, displaying different types of handcrafting. From "Make-up: Wie man professionell schminkt" a 0.35-minute-long video showed someone getting their make-up done by a professional make-up artist, a 0.35 long sequence of "Wie man eine Hochzeitstorte backt" portrayed someone making a wedding cake and the 0.58 minutes scene from "Wie man ein Costum painting für ein Motorrad macht" displayed an expert drawing a costume design on a helmet. In addition to this, a 1.23-minute-long clip from "Wie man Mokume-Gane-Trauringe schmiedet" showcased how traditional rings are made and from "Wie man einen Frack schneidert" a 2.03-minute-long scene on tailoring a suit was added. All of the videos for this part of the study were taken from the ARD online media library.

Instruments

Fragebogen zu dissoziativen Symptomen (FDS)

This study used the 28-item self-report questionnaire FDS to measure trait dissociation. The FDS is the German version of The Dissociative Experience Scale-II (DES-II), the most commonly used instrument to measure trait dissociation in clinical samples as well as the general population. It measures dissociation via a wide range of dissociative phenomena like amnesia, derealisation, depersonalisation, and absorption. The Test-retest reliability ranged from .78 to .93 and the internal consistency was .93 for the DES-II (Serrano Sevillano et al., 2017). Participants answer the questionnaire according to how often they experience the presented statement in everyday life on a sequence of numbers ranging from 0% to 100% with increments of 10. These everyday life scenarios range from experiencing daydreams as if they were real, not recognizing family members/friends or not being able to remember parts of a car ride. The exact items in German can be found in table 2. The authors of the FDS suggested a Cut-off of 25% or 30% for a subdivision in lower, healthy forms of dissociation and higher, unhealthy amounts (Spitzer et al., 2004). For this study the FDS was used in a continues way as the sample represents the general population and high amounts of dissociation were therefore expected to not be presented in very prominent numbers in this sample. This was also expected to lead to less data loss and higher power as well as higher validity.

Table 3:
FDS-Items in German

Item-Number	Question
1	Manche Menschen machen die Erfahrung, dass sie in einem Auto fahren und plötzlich merken, dass sie nicht mehr Wissen, was währen eines Teils oder der ganzen Fahrt passierte.
2	Manche Menschen hören manchmal jemandem zu und bemerken plötzlich, dass sie alles oder Teile dessen, was gesagt wurde nicht gehört haben.
3	Manche Menschen machen die Erfahrung, sich plötzlich an einem Ort zu befinden, ohne dass sie wissen, wie sie dahin gekommen sind.
4	Manche Menschen machen die Erfahrung, dass sie sich in Kleidung vorfinden von der sie sich nicht erinnern, sie angezogen zu haben.
5	Manche Menschen machen die Erfahrung, dass sie neue Gegenstände unter ihren Sachen finden, von denen sie nicht wissen, wo sie herkommen.
6	Manche Menschen machen die Erfahrung, dass ihnen unbekannte Leute auf sie zukommen, sie manchmal mit einem anderen Namen ansprechen oder behaupten sie zu kennen.
7	Manche Menschen haben manchmal das Gefühl neben sich selber zu stehen oder sich selbst bei etwas zuzuschauen. Manchmal haben sie dabei auch den Eindruck, einer fremden Person zuzuschauen.
8	Manche Menschen wird gesagt, dass sie Freunde oder Familienmitglieder nicht wiedererkannt haben.
9	Manche Menschen erinnern sich an wichtige Ereignisse in ihrem Leben nicht (zum Beispiel: Hochzeit oder Schulabschluss)
10	Manche Menschen wird vorgeworfen, dass sie lügen, obwohl sie sicher sind, nicht gelogen zu haben.
11	Manche Menschen schauen in den Spiegel und erkennen sich nicht.
12	Manche Menschen machen die Erfahrung, dass sie andere Leute, Gegenstände und die Welt um sich herum nicht als wirklich empfinden.
13	Manche Menschen erleben ein Gefühl, wie wenn ihr Körper nicht zu Ihnen zu gehören scheint.
14	Manche Menschen erinnern sich manchmal an frühere Erlebnisse so intensiv, als ob sie das Ereignis noch einmal erleben würden.
15	Manche Menschen wissen manchmal nicht, ob sie Dinge, an die sie sich er-

	innern wirklich erlebten oder ob sie sie geträumt haben.
16	Manche Menschen fühlen sich manchmal an einem Ort der ihnen vertraut ist, fremd und unvertraut.
17	Manche Menschen machen die Erfahrung, wenn sie einen Film sehen, dass sie so mitgehen, dass sie andere Dinge, die um sie herum geschehen, nicht bemerken.
18	Manche Menschen erleben manche Phantasien oder Tagträume so intensiv, dass sie sie als wirklich empfinden.
19	Manche Menschen machen die Erfahrung, dass sie fähig sind, Schmerzen manchmal nicht mehr zu empfinden.
20	Manche Menschen sitzen manchmal nur da und starren in die Luft, ohne dass sie an irgend etwas denken oder bemerken wie die Zeit vergeht.
21	Manche Menschen sprechen laut mit sich selber wen sie alleine sind.
22	Manche Menschen finden, dass sie in einer Situation so verschieden von anderen Situationen handeln können, dass sie sich fast erleben als ob sie zwei Personen wären.
23	Manche Menschen machen die Erfahrung, dass sie in bestimmten Situationen Dinge mit Leichtigkeit und Spontanität tun können, die ihnen sonst schwer fallen (Zum Beispiel: Sport, Arbeit, soziale Situationen).
24	Manche Menschen können sich manchmal nicht erinnern, ob sie etwas getan haben oder nur daran gedacht haben etwas zu tun (zum Beispiel: einen Brief einwerfen oder nur daran denken es zu tun).
25	Manche Menschen finden Dinge bei sich, die darauf hinweisen, dass sie etwas getan haben. An das Tun selbst aber haben sie keine Erinnerung.
26	Manche Menschen finden manchmal Schriftstücke, Zeichnungen oder Notizen unter ihren Sachen, die von ihnen stammen müssten. Sie erinnern sich aber nicht mehr, sie angefertigt zu haben.
27	Manche Menschen hören manchmal Stimmen in ihrem Kopf, die ihnen Dinge sagen, die sie tun sollen oder Kommentare über etwas machen, was sie gerade tun.
28	Manche Menschen fühlen sich manchmal so, als ob sie die Welt durch einen Nebel wahrnehmen würden, so dass Menschen und Gegenstände weit weg oder unklar erscheinen.

Dissoziation-Spannungs-Skala-4-akut (DSS-4-akut)

The DSS-4-akut is a 4-item instrument, originally developed to assess dissociative experiences during neuropsychological studies with clinical as well as non-clinical samples (Stiglmayr et al., 2009). As there is a lack of self-report questionnaires that measure state dissociation in the general population, the use of the DSS-4-akut for this study is justified because the underlying construct - acute dissociative experiences – is relevant in a wide range of experimental settings and its application should not be limited to neuropsychological studies. The scale captures transient dissociative states that occur in response to various situational or emotional stimuli, which makes it suitable for experimental contexts beyond neuropsychological testing. This questionnaire, as displayed in table 3, consists of a question on not feeling like one's body is belonging to themself, hearing noises from farer away as they actually are, the surrounding environment and people feeling as they are surreal and being unable to experience pain. The DSS-4-akute is used in this study to assess state-dissociation after the main nature- and human-based movie viewing experience.

Table 4
DSS-4-akut Items in German

Item-Number	Question
1	Ich habe den Eindruck, dass mein Körper nicht zu mir gehört.
2	Ich habe Probleme beim Hören. Beispielsweise nehme ich Geräusche aus der Nähe so wahr, als kämen sie aus der Ferne
3	Ich habe den Eindruck, dass andere Menschen oder Dinge um nicht herum unwirklich sind.
4	Ich habe den Eindruck, dass mein Körper oder Teile davon unempfindlich gegenüber Schmerz sind.

Time estimation

Subjective time perception was assessed with a single self-report item. Participants were asked to estimate the duration of each movie clip in minutes and seconds ("Wie viele Minuten und Sekunden hat die gezeigte Filmszene Ihrer Einschätzung nach gedauert?"). To ensure that the answers were in the right format a brief instruction was given ("Bitte tragen Sie die geschätzte Dauer im Format MM:SS ein. Beispielsweise 01:30 für 1 Minute und 30 Sekunden. Verwenden Sie nur Zahlen und Doppelpunkte, keine Wörter."). But also estimations that differed from the specific format were included in the analysis, if the answer was identifiable. This item was designed to capture participants subjective experience of time pas-

sing during the stimulus presentation and was presented to them directly after every movie clip.

Additional questions

After reading the introduction and agreeing to the declaration of consent, the participants answered the first 3 questions on how old they were, how wakeful they felt in the moment and how stressed they were. After both 7.41 video clips all participants had to answer once again, how stressed they felt. At the end of the study, after all visual stimuli were viewed, the participants answered 2 questions on how they perceived the emotional substance of the material and how interested they were in the movie scenes.

Analyses

All statistical analyses were conducted using R 4.5.2 with the RStudio version 2026.01.1+403 (2026.01.1+403). For all analyses, effect sizes were reported as either Pearson's *r* or Cohen's *d* based on the statistical test used for the specific hypothesis.

To calculate time accuracy, all reported time guesses were first converted into seconds. It is important to note, that despite a specific answer format being specified in the question (*MM:SS*), participants sometimes used a different way to communicate their results (e.g. ideal would have been 06:00 but some only wrote 6). All identifiable answers were used for the analysis but some indistinguishable answers had to be excluded (e.g. /:36).

Time perception accuracy was calculated for each participant in each film condition as the difference between the estimated duration and the target time. Finally, the mean was calculated for both human-based and nature-based main videos.

For the first hypothesis "Trait dissociation predicts differences in time perception accuracy" Spearman analyses were conducted between participants' trait dissociation scores and their mean time perception accuracy across both film condition. The Spearman analysis was used, due to a Shapiro-Wilk-Test suggesting the data does not meet normality assumptions.

To test the effect of movie type on time perception accuracy (H2) a Wilcoxon Single-Rank Test was performed comparing the time perception accuracy scores between the nature-based and the human-based film conditions, taking advantage of the within-subjects design. This nonparametric statistical test was used due to unmet normality assumptions.

The same procedure was used for the third and last hypothesis on the state dissociation based on the movie type, after the change scores were calculated for both nature-based and human-based compared to the baseline. Therefore, another Wilcoxon Single-Rank Test was

performed comparing the state dissociation scores between the nature-based and the human-based film conditions.

Results

General demographics

Altogether 120 individuals took part in this study. Only 99 participants reported their age resulting in a mean of 22.4 years and therefore a very young sample. Only 3 people reported an age above 30 including two individuals over 50 years old. Almost all data was useable, besides 5 time estimations for the shorter movie scenes that had to be excluded due to them not being possible (00:00), unidentifiable (e.g. /:50) or left blank. No outliners were excluded because even very high or low time estimations still seemed plausible in this context and the removal of this data seemed unjustified and would have lowered the variation. All other measurements, especially those for trait and state dissociation, were generally very low and no outliners were found within these as well.

Trait dissociation and time accuracy

To test the first hypothesis, if there is a connection between the trait dissociation and time accuracy in general, all individual scores of the FDS items were added, to have the sum trait dissociation for all participants. Secondly, the time accuracy, that was calculated from the difference between the time estimation in seconds and the duration of the seen video for both nature-based and human-based, was added up for an overall time accuracy and the mean was calculated, which can be seen in table 5. The spearman correlation test resulted in rho = 0.050 and p = .58, revealing no significant correlation between trait dissociation and time accuracy. Generally, the reported trait dissociation was very low, which can be expected with non-clinical participant but this resulted in a very homogenous sample. Overall, the time estimations were close to the real time-frame, with a similar amount of people overestimation as well as underestimating the duration.

Table 5
Descriptives of trait dissociation, time estimation and time accuracy.

Variable	Mean	Median	Standard deviation	Min	Max	Q1	Q3
Trait dissociation	78.08	70.5	34.45	32	181	52.00	95.5
Time-estimation human	438.19	430.0	132.72	120	885	340.00	510.0
Time-estimation nature	436.56	442.5	127.94	150	900	348.75	510.0

Time-accuracy human	-22.81	-31.0	132.27	-341	424	-121.00	49.0
Time accuracy nature	-24.44	-18.5	127.94	-311	439	-112.25	-18.5
Time-accuracy	-24.44	-18.5	127.94	-311	439	-112.25	49.0

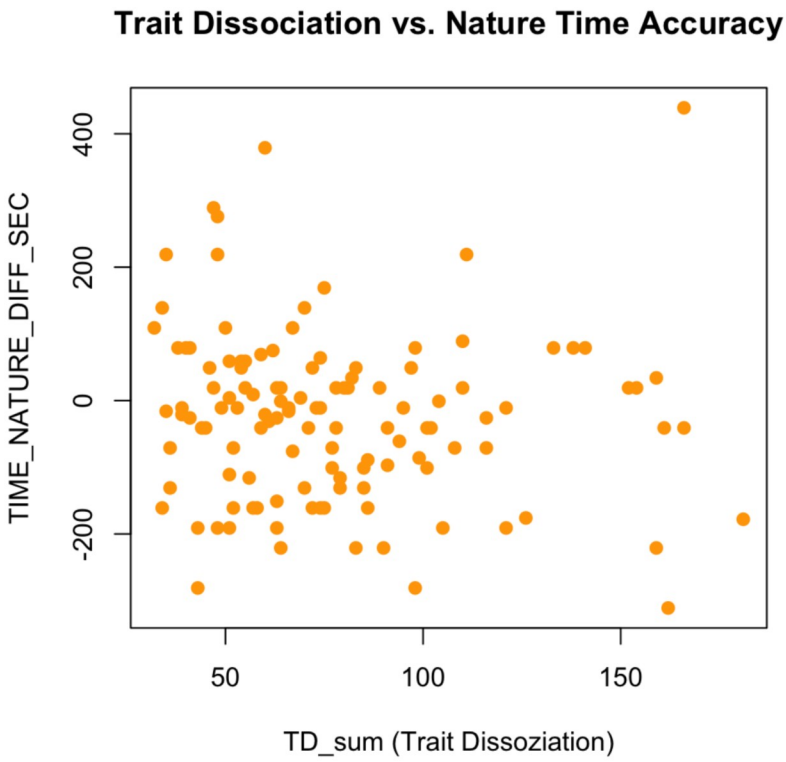

Figure 2
Scatterplot between trait dissociation and time accuracy in the nature-based video.

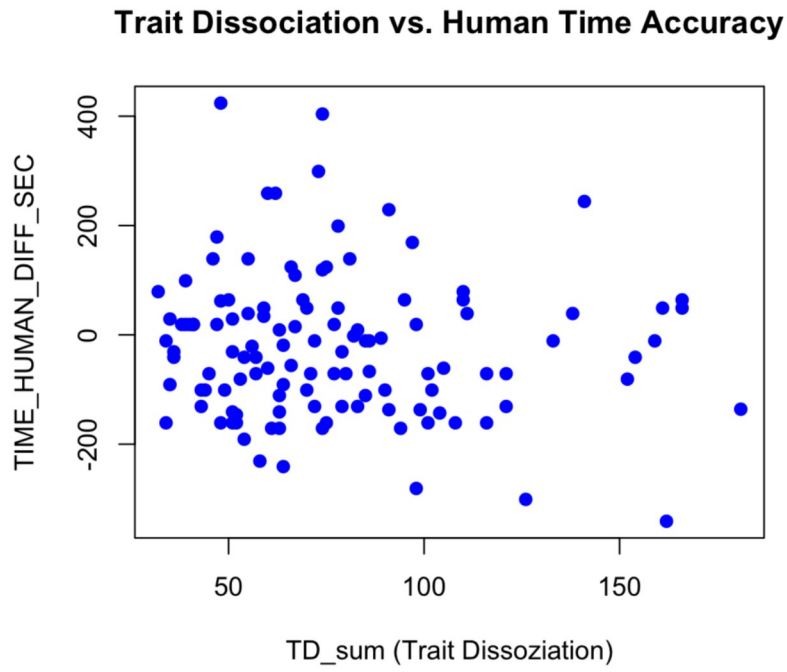

Figure 3
Scatterplot between trait dissociation and time accuracy in the human-based video.

Time accuracy and movie type

The second hypothesis, researched whether there was a difference between time accuracy depending on the movie type and was tested via a Wilcoxon Single-Rank Test, comparing the time accuracy between the nature- and human-based scene. This resulted in $V = 3125$ and a p-value of .91, therefore revealing no significant correlation between time accuracy and movie type.

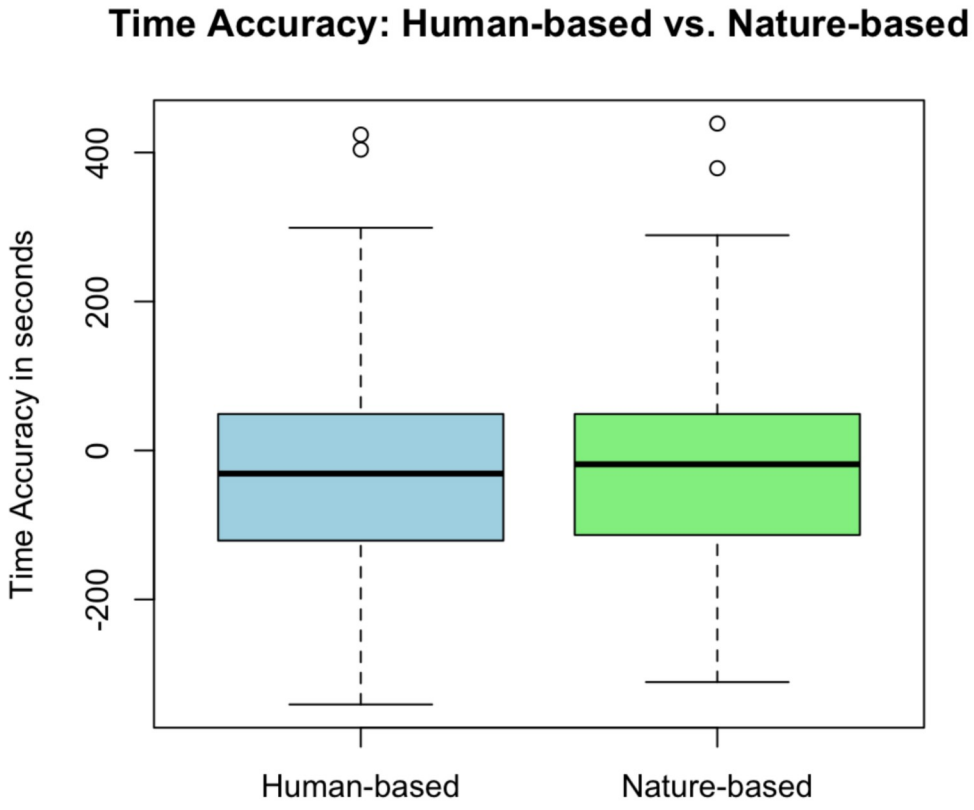

Figure 4
estimated time for human-based and nature-based movie scene with true duration.

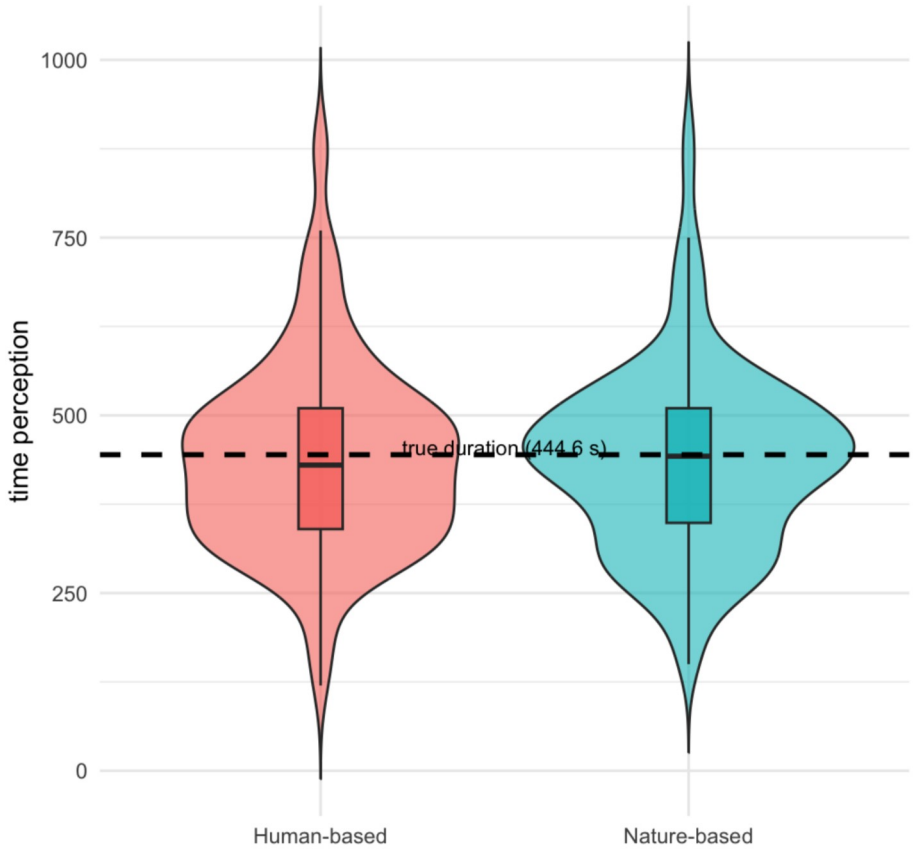

Figure 5
time perception accuracy for nature- and human-based movie clip.

State dissociation and movie type

For the third hypothesis, if there was a difference in the reported state dissociation after the nature- and human-based video, the sum score for the baseline dissociation was calculated as well as for after the nature video experience and after viewing the human-based movie scene and a change score was created. This change score was then used for the Wilcoxon Single-Rank Test that resulted in $V = 404.5$ and $p = 0.4036$, revealing that the third hypothesis was also not significant.

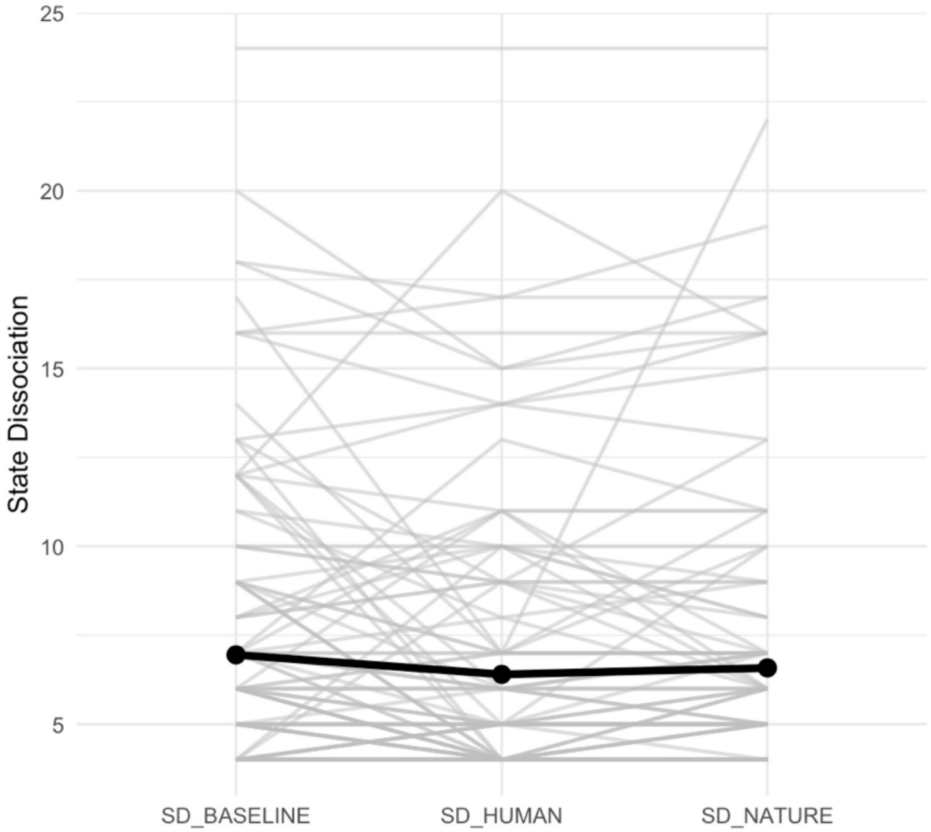

Figure 6
State dissociation before watching any type of movie, after watching the human-based video and after watching the nature-based material.

Exploratory analysis

Additional exploratory analyses were made looking further into the reported stress, state dissociation independent of movie type and analysing the smaller videos that were also included in the study design.

To investigate a possible difference in reported stress depending on what movie type was viewed, I first divided the participants into the group that first viewed the human- and then the nature-based video (HN-Group), opposing the group that saw the material in the other order (NH-Group). Means were calculated for conditions and movie types. The group that first viewed the human-based movie scene and then the nature material had a mean stress of 25.1 after the human video and 21.15 after the nature video. For the other group, that first viewed the nature material and after that the human-based movie scene, resulted in a mean stress after the human video of 25.25 and after the nature video 24.4. A summary of the exact findings can be found in Table 6. Multiple Wilcoxon Single-Rank tests were then conducted to compare the reported stress statistically.

The first Wilcoxon test, comparing the stress after the human-based video in both groups resulted in W = 1900 and a *p*-value of .60, revealing no significant difference between the order in which the movies were viewed. The second Wilcox test compared the same dynamic as the first, but for the nature-based video and revealed W = 1672.5 with a *p*-value of .51 and therefore no significant difference between the two groups. A third Wilcox test was used to compare the reported stress after the nature- versus the human-based video, independent of the group the participants were in regarding the order. This test resulted in V = 3006.5 with a *p*-value of .0017 and therefore showed a significant difference in the reported stress. To reveal in what direction this effect points, the difference in median (human-nature) was calculated, resulting in +1 and therefore indicating that less stress was reported after the nature-videos were viewed than after the human-based videos with an effect size of Cohens $d = .29$ that can be interpreted as a medium effect.

A fourth, and for the research question on stress, last signed rank Wilcox test was used in order to compare the immediate stress that was measured at the beginning of the study with the average stress that was reported right after the human-centred and the nature-centred film clips were viewed, combined into a single post-exposure measure. The test revealed a highly significant reduction in stress following any type of film exposure with a finding of V = 5660 and $p < .001$, clearly demonstrating that the null hypothesis of no change can be rejected.

To estimate the precision of this effect, a bootstrap procedure was conducted to estimate a 95% confidence interval for the mean difference between the pre- and post-stress scores. The resulting interval for this test ranged from -15.29 to -9.27, indicating a substantial average decrease in stress level.

Table 6
Descriptives of reported stress.

Variable	Mean	Median	SD	Min	Max	Q1	Q2
Stress before	36.23	34.0	21.59	1	88	22	53.25
Stress after human video	25.18	20	20.76	1	94	8	38.25
Stress after nature video	22.78	19.5	18.38	1	76	7	37.5
HN: Stress after human video	25.10	20.5	18.67	1	67	10	38
HN: Stress after nature video	21.15	15.5	17.04	1	54	7	37.25
NH: Stress after human video	25.25	19.5	22.83	1	94	5	39.25
NH: Stress after nature video	24.40	22.5	19.63	1	76	7	37.25

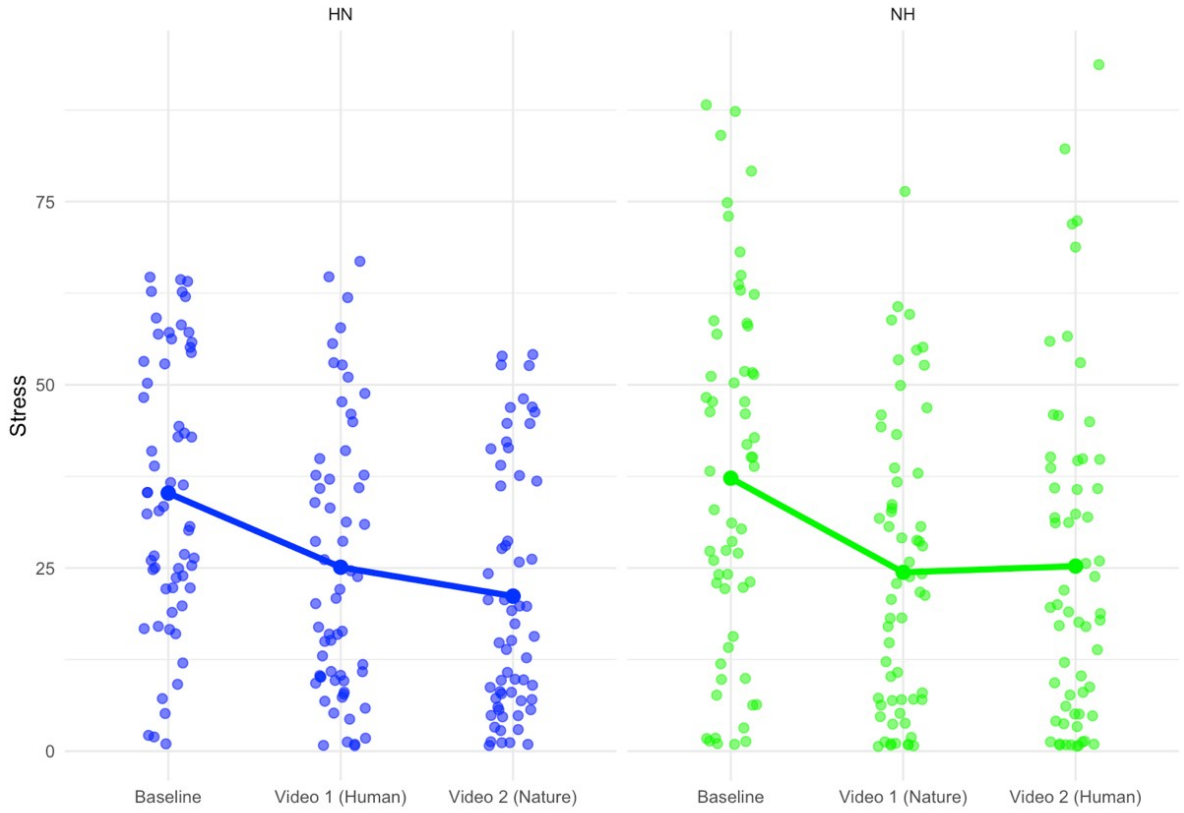

Figure 7
Stress before watching any video, after watching the first video and after watching the second video for both groups.

Another additional exploratory analysis was used to conduct whether there was a difference in state dissociation not between the two different types of movies, but between the baseline and after the movie viewing experience in general. For that statistical analysis, the mean of the state dissociation after the video viewing was conducted and a change score was estimated for the difference between the mean state dissociation after versus before. A Wilcoxon single-rank test resulted in V = 894.5 with a *p*-value of .04 revealing a significant difference to the baseline. The mean (-0.46) indicates the effect to point in the direction of the state dissociation being lower after a movie scene was viewed than before.

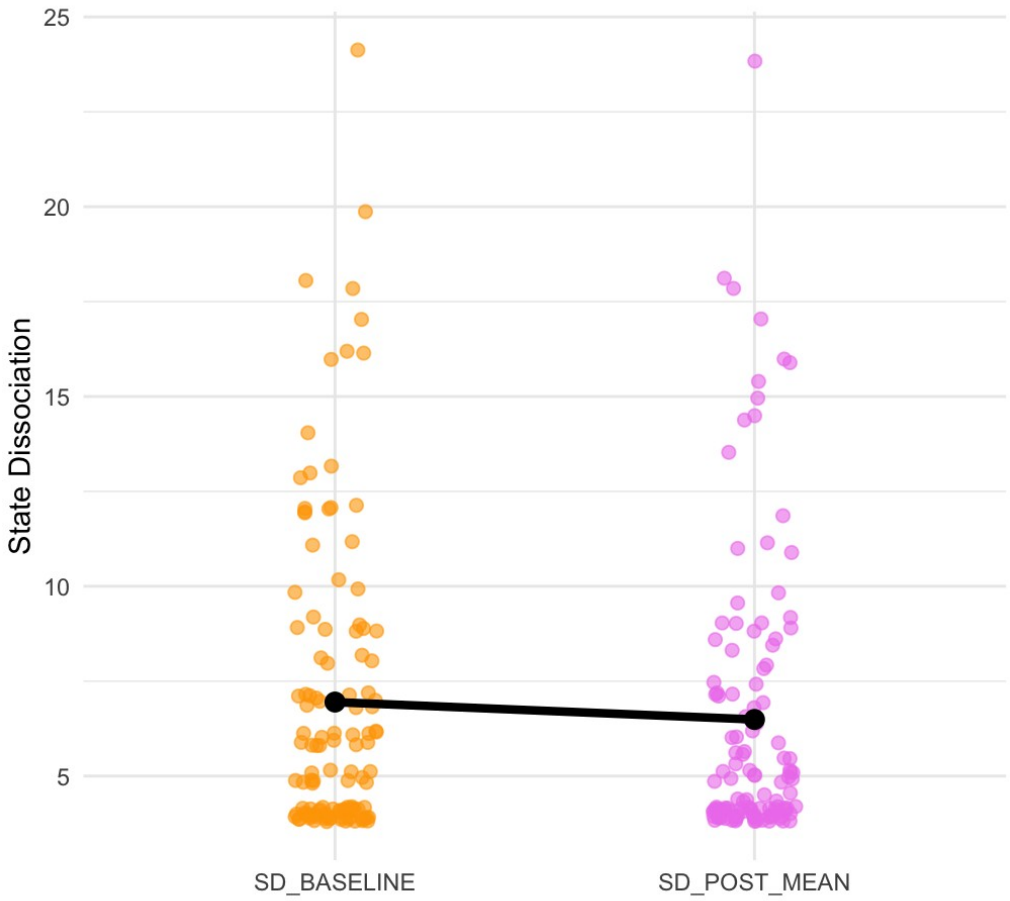

Figure 8
State dissociation before watching a video and after watching any video independent of which one.

The last exploratory analysis regarded the last part of the study design, where 10 shorter nature- and human-based movie scenes were showcased to the participants. It was once again important that all time estimations were included that were identifiable, not regarding if they were fully identical to the suggested format in the questionnaire, so all answers needed to be standardised and converted into seconds. The time accuracy was calculated for every of the 10 videos, which is displayed in table 7. The average for both categories per person was estimated and a Wilcoxon Single-ranked test revealed W = 6675.5 with a *p*-value of .33 revealing no significant difference between the estimated time for the human- versus nature-based shorter videos at the end of the study.

Table 7
Time accuracy per video.

Video content	Mean accuracy in seconds	Standard deviation
Drawing	-11.3	20.4
Deer	-0.11	9.48

Make-up	0.34	11.6
Forest	4.37	33.8
Sea	5.69	43.0
Rings	7.61	40.8
Backing	7.63	17.2
Tailoring	14.8	54.6
Eagle	18.9	50.4
Lynx	28.4	271.0

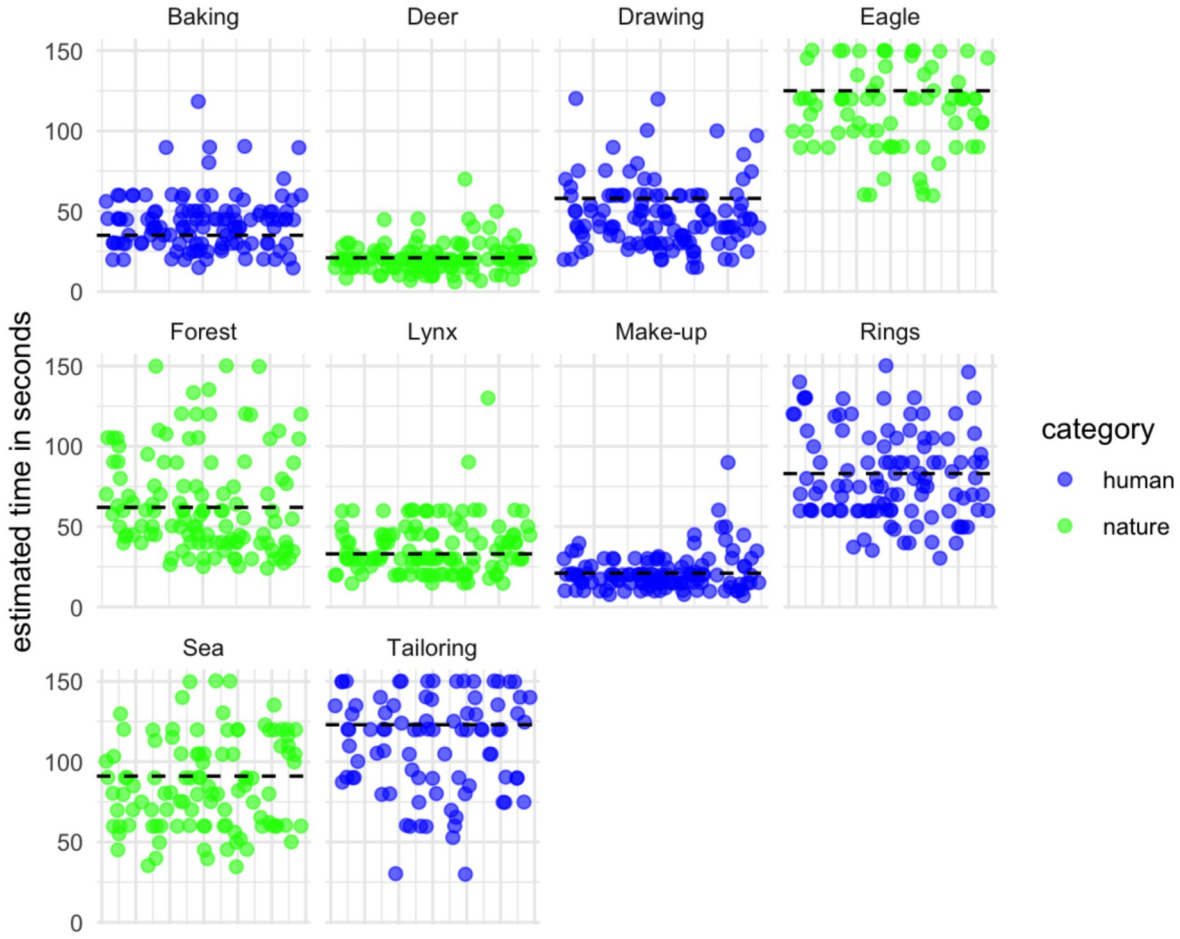

Figure 9
Estimated time in seconds per video with correct duration.

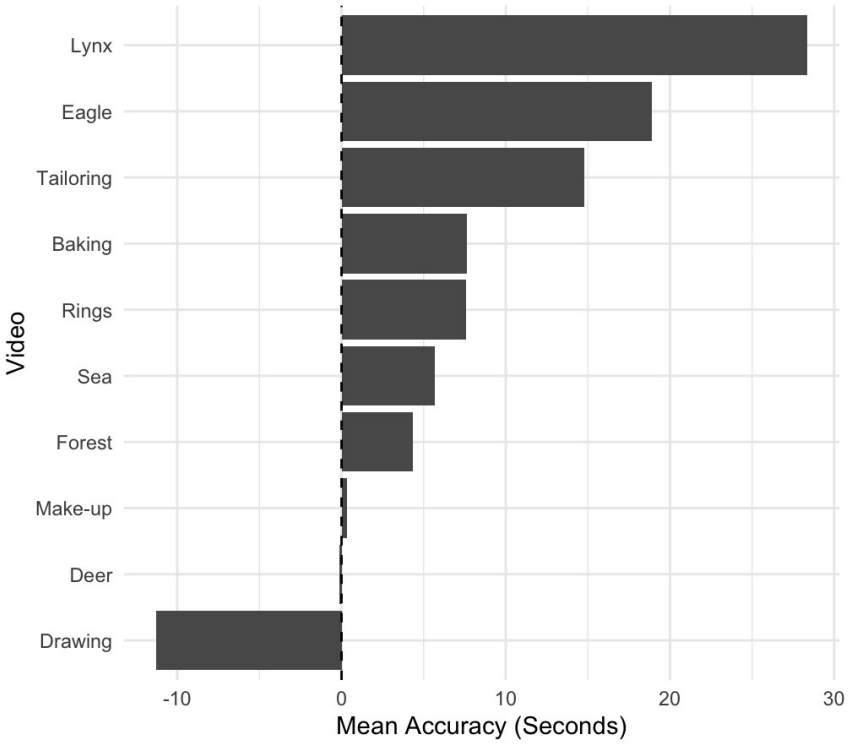

Figure 10
Time accuracy per video.

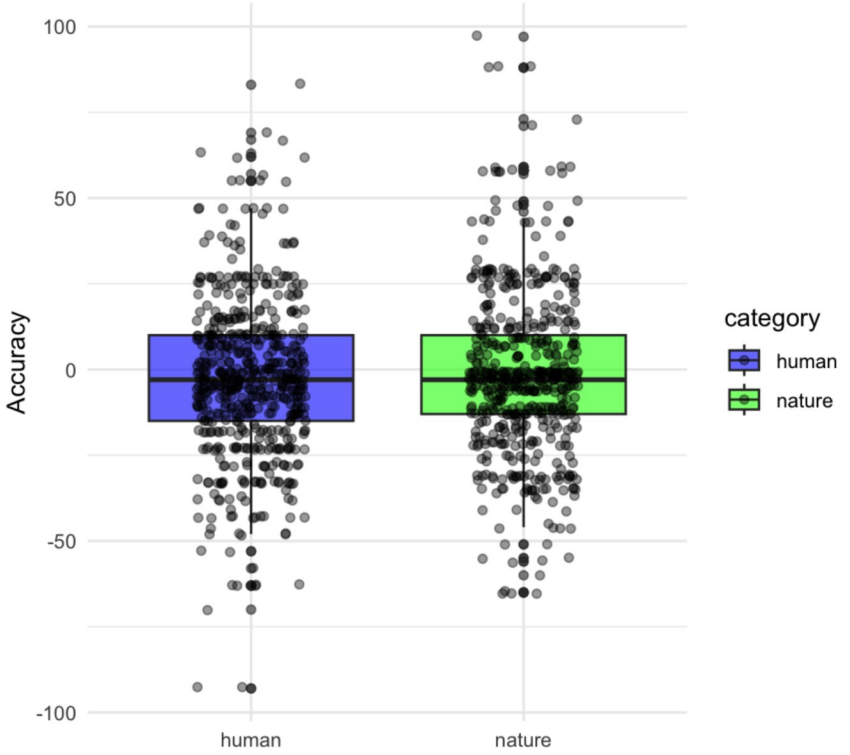

Figure 11
Time perception accuracy for the 5 smaller human-based and the 5 smaller nature-based videos.

Additional data

Before the movie viewing experience, the participants were asked to rate their wakefulness on a scale from 1 to 101, as this being the standard setting for questions with a slider. The reported mean was 63.66 with a standard deviation of 21.22. A more detailed description can be found in table 8.

After viewing the videos, the participants were able to rate the movie experience on how emotional and how interesting they think the shown visual material was on a scale from 1 to 5. The mean for the reported emotionality was 2.23 with a standard deviation of 0.84. The interest in the material got a mean of 3.07 with a standard deviation of 0.89. More details on these items can also be found in table 8.

Table 8
Table of the variables wakefulness, emotionality and interest.

Variable	Mean	Median	SD	Min	Max	Q1	Q2
wakefulness	63.66	67	21.22	18	101	20.00	23.00
emotionality	2.23	2	0.84	1	4	2.00	3.00
interest	3.07	3	0.89	1	5	2.75	4.00

Discussion

The aim of this study was to investigate the interaction between dissociation and film. As past studies have shown a positive effect of nature on mental health in general (e.g. Han & Sabran, 2025) this study focused on nature-based movie scenes as a possible form of intervention for people struggling with dysfunctional amounts of dissociative experiences. Additional to self-report questionnaires on trait as well as state dissociation, the time perception accuracy was included as a form of objective measurement on the distortion of time and absorption into the visual material.

The first hypothesis tackled the question of whether trait dissociation and time perception accuracy were connected. Statistical analysis revealed no significant correlation; the data therefore showed no difference in the perceived time for people with different amounts of trait dissociation. This finding does not match with recent research and the overall assumption, that a symptom of dysfunctional dissociation is getting absorbed by external stimuli and loosing track of one's surroundings and the time. One explanation for the dissimilar finding could be, that this study used a non-clinical sampling and therefore the overall trait dissociation can be expected to be lower than it would have been with clinical participants. The lowest possible score in trait dissociation was 28 and the highest 308, the calculated mean score of 78.08 was

therefore very low. Noone of the study subjects scored higher than 200 and only 9 of the 120 participants had a trait dissociation higher than 150. The data therefore consisted of mostly lower dissociation scores and doesn't have much variability when it comes to this questionnaire, which could be a possible explanation for not finding a correlation between trait dissociation and time accuracy. It is additionally possible, that this absorption and distortion of time is more visible on a broader timeframe ranging from weeks to years that feel longer/ shorter than they actually are, but cannot be seen with guessing how long a short movie scene was. Further research is needed to differentiate contrasting effects regarding the period of time.

As for the second research question, this study analysed whether the calculated time accuracy differed depending on the movie type that was viewed. The statistical analysis revealed no significant finding for this assumption, which may be explained by several factors of the study design but also the sample. Most importantly, the film clips may not have differed sufficiently in their temporal impact. Although the videos varied in the portrayed content (nature-focused vs. human-focused) both were part of documentaries and therefore similar in cinematic style. All movie scenes can be characterised by a calm atmosphere and no or at least low narrative complexity. As a result, both types of movies may have caused similar levels of arousal and therefore absorption. Consequently, the manipulation may have been too subtle to produce systematic differences in time accuracy.

As mentioned before, this could also be influences by the low variability in trait dissociation, as the effect could have been more present with individuals struggling from higher amounts of dissociation. Taken together, the null findings suggest that time accuracy is relatively robust on modest variations in film content and may primarily depend on individual cognitive or attentional traits rather than on the external stimulus alone.

The last hypothesis involved whether the reported state dissociation differed depending on what movie type was viewed. This also resulted in no significant finding and therefore suggests, that neither of the two movie types had a stronger effect on the reported dissociation. Similar to the trait dissociation, the participants reported pretty low state dissociation in general. The possible lowest score for state dissociation in all three questionnaires was 4 and the highest 24. The calculated mean for the baseline was 6.95, for the state dissociation reported after the nature video it was 6.58 and for the questionnaire after the human-based material it was 6.40. Therefore, at all three times, the participants reported very low state dissociation, which could explain why no significant correlation was found between state dissociation and the movie experience.

Another explanation could also be that the two types of movies were too similar to result in enough difference, as was already discussed above. Besides both videos having the same outcome in state-dissociation due to documentaries in general having the same effects in absorption, they could also lower dissociation in different ways but resulting in the same effects. Therefore the nature videos, orienting on scientific findings, could reduce dissociation via the grounding and calming impact of natural environments and elements that were displayed (e.g. Han & Sabran, 2025). The human-based videos, on the other hand, could lower state-dissociation due to slow social involvement and illustration of soothe handcrafting. As a result, a possible explanation could be, that both types of movies have different effects on mental health, but as both have similar positive impacts, there was no variation in the data found. Consequently, more studies are needed to research the difference between nature- and human-based videos that not only focus on the resulting impact but also in what way they lead to these findings.

Exploratory analysis

While all hypothesis resulted in no significant findings, additional exploratory analysis proceeded to find significant results. Firstly, independent of the order in which the movie scenes were viewed, there was significantly lower reported stress after the nature-based movie scene was viewed. This suggests that, aligning with past research, nature-based movie scenes have soothing effects on the mind and can help people to ground themselves. While not finding an effect on reported dissociation, the nature-based clip still had a positive impact on the individuals. This could be explained by nature-based movie scenes having a more general influence on mental health, because this study did not find this effect to be specified for maladaptive amounts of dissociation. Future studies could focus on separate facets of mental health to determine where the calming effects of nature-based film can be efficiently adapted. In particular, they could address whether the absence of a significant outcome for dissociation reflects a true lack of impacts, or whether other aspects – especially symptoms associated with specific mental disorders – benefit more strongly from this type of intervention. Which brings us to the second significant finding, that independent of the movie type, the reported state dissociation was less than before watching any movie, suggesting both video types had a positive effect on state dissociation. This could be explained by both nature- as well as human-based movie scenes originating from documentaries and therefore both having grounding effects that make the viewers feel less disconnected to their bodies and surroundings. This finding suggests, that cinematherapy in form of calming documentaries which are viewed without any

audio, so the visual material alone, can have an at least short-term positive impact on reported state dissociation. The third and last exploratory analysis on the 10 shorter videos at the end of the study had, as the main hypothesis, no significant result. Therefore, the effect on time accuracy differing between nature- and human-based movie scenes was also not true for multiple, shorter video clips ranging from 0.21 minutes to 2.05 minutes. Aligning with the finding from the second hypothesis, it makes sense, that the lack of a difference in time accuracy for the 7.41 minute long main videos, was also reflected in the part with the shorter movie scenes. This is still important, as recent literature suggested that there was no difference in the reported dissociation based on the movie length and therefore shorter scenes should result in just the same amount of absorption than longer ones. In this case, no difference in time accuracy was found for any timeframe.

Taken together, this study found no difference in the effect of nature- vs. human-based movie scenes on dissociation. The subjective self-report questionnaires as well as the objective time perception accuracy demonstrated no superior position of visual material that portrays nature instead of scenes that focus on humans doing different types of handcrafting. But this study also found a generalised positive effect of the portrayed movies on the state dissociation as well as a general but also nature-specific finding in the reported stress-levels. This fits into scientific findings on movie-interventions and suggests that especially documentaries could also be a therapeutic tool for individuals struggling with maladaptive amounts of dissociation and at least in a short-term period, lower their dissociative experiences. When it comes to experiencing stress, this study found a small superiority of nature-based movies in comparison to human-based movies, which aligns with research of the calming effects of natural environments and illustrations of it. As this was not found for state-dissociation, it could be argued, that this impact is not transferable to situational dissociation and could be specific to stress or different aspects of mental health. More research is needed to tackle the question of specific impacts of nature-based movies on different types of mental disorders and struggles. As a non-clinical sample was used, where only small amounts of trait as well as state dissociation was reported, this study shows that not only individuals that have a clinical diagnosis can benefit from interventions like this, but also regular people can implement calm videos in their everyday life to reduce their stress-level and reconnect with their body and surroundings.

As for additional strengths of this study, it should be mentioned, that an experimental design was used where people participated under standardised circumstances and were randomly assigned to the different experimental conditions, assuring the ability to form stronger conclusions about potential causal relationships and increasing internal validity. It’s also one

of few studies that simultaneously investigated both trait and state dissociation, allowing a more nuanced understanding of how dispositional tendencies and situational factors may interact in shaping dissociative experiences during film viewing. This study also contributed to bridging research from different psychological fields by combining topics from clinical as well as media psychology. By examining dissociative experiences in response to film material, this study explored how mechanisms typically discussed exclusively in clinical contexts, can be adapted to the everyday life of non-clinical people that still struggle with mental health issues.

Limitations and future research

It is important that the limitations of this study are considers. First, as can be seen in Figure 1, the study sample mostly consisted of people in the ages between 18 and 27, which was to be expected when using the LABS-System to generate participants, as it is mostly centred around university students. Therefore, the found results cannot be generalised for all age groups, as the data consisted of mostly younger cohorts. The reported results of no significant findings in the hypothesis, but a general overall positive effect of nature-based movie scenes on mental health, could be different for other cohorts, especially older individuals. Another limitation due to the chosen type of recruitment is, that most of the participants are university students, especially from the psychological field. This limits the generalisability of the findings as psychological students might be more familiar with psychological concepts than the general population and the researched effects could be adverse in different social groups. Therefore, findings could differ in individuals with other socioeconomic status but also people who are not very familiar with psychology or scientific research in general.

Further limitations regard the used questionnaires to measure dissociation in the participants. The state-dissociation questionnaire DSS-4-akut was previously mostly used for measurements in neurological research and might not be ideal for this type of study. As there are currently no better widely established and well-validated questionnaires for surveying state-dissociation, the DSS-4-akut was chosen despised of this. More research is needed to find a more suitable way to assess state-dissociation in studies that go beyond neurological measurements, as this facet is also highly relevant in general psychology or different fields like behavioural psychology. When it comes to trait-dissociation, the FDS is a more commonly used questionnaire in the field of dissociation and is used by many studies that are comparable with the present one. Despite this, the percent-based question style of the FDS may have been somewhat unintuitive for some participants, as it is more difficult to divide one's life into per-

centages than to, for example, specify on how many days in the last two weeks something occurred. This could have led to more response inconsistency in the data, as the timeframes could have been interpretated differently by the participants. More exploration is therefore needed to develop other, more intuitive questionnaires to investigate situational as well as lasting dissociative experiences in non-neurological settings, as these are important facets in mental health research.

It is also important to mention that participants had to estimate the timeframe of the presented videos multiple times, so it is possible that some participants became aware that time perception was a variable of interest and may have started consciously counting seconds or paying closer attention to the passage of time. Such strategies could influence subjective time estimation and reduce the spontaneity of the results. Explicitly instructing participants beforehand not to count the lapse of time was considered but might have inadvertently drawn additional attention to the passing of time and thereby increasing the likelihood of such strategies. Another factor that could also have tributed to the time estimation being close to the correct time frame is, that the participants knew that the whole study lasts 45 minutes, as it was announced in the LABs system where participants registered for the study. This information was necessary to ensure that participants were aware of the duration they were expected to estimate for the appointment. It was also relevant in the context of the course credits they received, as the number of credits granted depended on the overall duration of the study. At the same time, providing this information may have inadvertently given participants a general sense of the timeframe within which the different video clips were able to fit, potentially influencing their time estimations. This was also reinforced by a continuous progress meter that could be seen at the right upper corner of the screen at all times with the information on how many percent of the study were already completed. However, it is important to mention, that this progress meter did not assess for the timeframe of the individual videos, just for the number of pages that were left till the end of the study, therefore the meter didn't really give away any information on the span of the individual movie clips.

As one last limitation it should be mentioned, that the participants only viewed parts of documentaries and not the whole film. This is more economical in the study setting of a master thesis but could also be more easily implemented in the person's life as a form of interventions, as it takes less time than watching a whole movie. Nonetheless, the effects for whole documentaries could vary as important parts of the structure of regular movies was missing, like the narrative built-up or emotional connection to the characters. Future studies that allow longer investigations could therefore implement whole documentaries; even shorter ones

would give more insight into the effect of whole documentaries on dissociative experiences. Ideally, this type of study could give more explicit results on documentaries in general instead of movie clips, as there could be dissimilar findings.

Generally, more studies on the positive effects of movie interventions are needed, that focus not only on the general mental health but specific facets of it, to ensure everyone can get accessible help for their struggles and can improve their psychological wellbeing. Future studies could try to further investigate if this stress and state-dissociation reducing effect is limited to scenes from different types of documentaries or if this could also be possible with narrative movies. Also, the superior effect on nature-based movies that was found on stress, could be verified with a more detailed and objective questionnaire on the experience of distress, since the present study only used a one item subjective question to measure stress. As this study also focussed solely on the visual experience, future research could also try to add the original audio of the movie scenes, to see if the multisensory experience would result in different findings. The additional research on audio-visual documentaries would be important, to conclude that this genre of movies has an overall effect on mental health and can be used as an easily accessible self-intervention; for now this study only found a positive impact when it comes to the visual experience alone.

AI-Statement

Artificial Intelligence tools, specifically OpenAI's ChatGPT, were used during the preparation of this paper. The tools assisted with formulating ideas, refining research questions, clarifying statistical concepts, providing codes for the statistic program R and improving the used academic English writing style. In addition, the AI-powered search engine Consensus was consulted at the beginning to explore scientific literature and gain initial insights into relevant empirical findings. All content was critically reviewed, edited, and approved by the author to ensure academic integrity and accuracy. No AI-generated content was included without thorough verification and adaptation to the specific research context.

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Appendix

Abstract

On the spectrum of dissociative experiences, people struggling with high amounts of maladaptive dissociation can deal with feelings of disconnectedness from their body and surrounding, which can lead to serious mental health struggles and affect the daily life of the suffering individual. Dissociation is therefore a psychological facet of high scientific interest and more studies are needed to improve treatment options and interventions, where film has shown to be a promising medium. This study explored the relationship between reported dissociation, time estimation and different scenes from nature- and human-based documentaries. There was no significant relationship found between trait dissociation and time accuracy for the viewed video material. Also time accuracy and the viewed movie type (human- vs. nature) did not have a significant relationship. Lastly, also the viewed movie type did not correlate with the state dissociation that was reported after the movie experience. On the other hand, there was a significant drop in reported stress-levels and state dissociation after any type of movie scenes was viewed, suggesting that film can improve the mental state at least in short term and be used as an accessible intervention.

Abstract German

Im Spektrum der dissoziativen Erfahrung, können Menschen mit hohen Werten in maladaptiver Dissoziation unter dem Gefühl leiden, sich vom eigenen Körper und der Umgebung abgegrenzt zu fühlen, was zu ernsthaften mentalen Problemen führen kann und den Alltag der betroffenen Individuen beeinflusst. Dissoziation ist deswegen eine psychologische Facette, die von hohem wissenschaftlichem Interesse ist und mehr Studien werden benötigt damit Behandlungsmöglichkeiten und Interventionen verbessert werden, wobei Filme sich als ein zuversichtliches Medium gezeigt haben. Diese Studie explorierte die Beziehung zwischen berichtete Dissoziation, Zeitwahrnehmung und Szenen aus natur- und menschenbasierten Dokumentationen. Es wurde keine signifikante Beziehung zwischen Trait-Dissoziation und Zeitgenauigkeit beim beobachteten Material gefunden. Auch Zeitgenauigkeit und die Art des Filmmaterials (Mensch vs. Natur) hatte keine signifikante Beziehung. Schließlich hat auch der Film-Typ nicht mit der danach berichteten State-Dissoziation korreliert. Auf der anderen Seite gab es einen signifikanten Abfall im Stressniveau sowie der State-Dissoziation, nachdem jegliche Art von Filmszene gesehen wurde, was suggeriert, dass Filme zu mindestens zu kurzfristiger Verbesserung des Geisteszustands beitragen können und als Interventionen genutzt werden können.