Value of culture

The cognitive value of culture

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Vlaanderen
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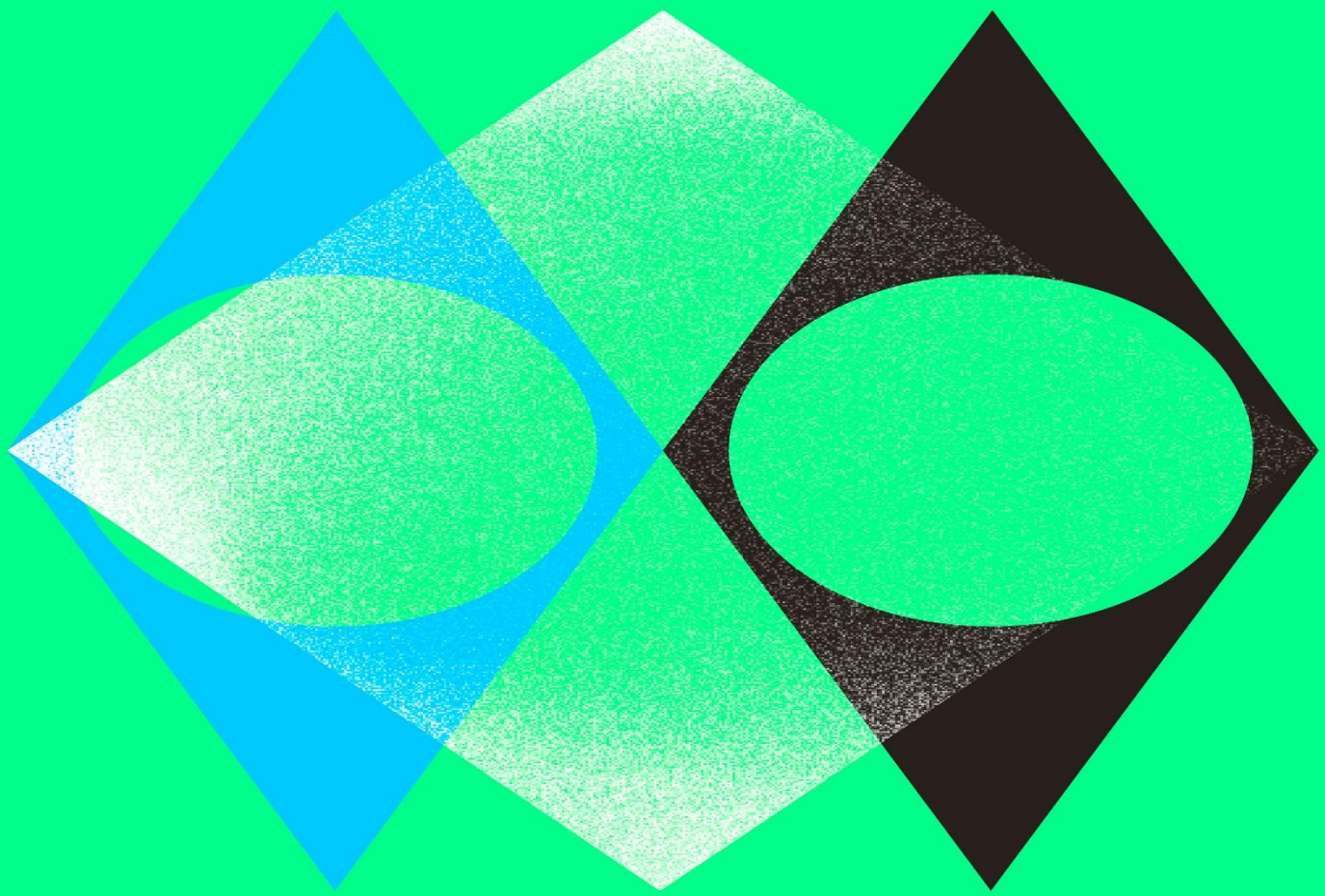

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Preliminary information regarding the methodology of this report

Based on a systematic literature review of scientific peer-reviewed articles published between 2014 and 2024, a series of reports by the Centre for Cultural Research examines what 'the value of culture' means according to the literature. The starting point was 18,013 articles that, according to a number of keywords in their abstracts, were potentially relevant to this research. Using the machine learning tool ASReview LAB – developed by Utrecht University – articles were screened in a second round based on their abstracts, leaving 113 relevant articles for this report on the cognitive value of culture. In a final round, the articles were read in full, resulting in the 83 references on which this report is based. The introductory report provides a more in-depth view of this method.

This sub-report on the value of culture focuses on the cognitive value of culture. Similar to the other reports in this series, the focus lies on cultural participation. It therefore consistently refers to (active or receptive) participation in cultural activities, occasions, events, classes and other forms of cultural provision. This definition has also been consistently applied in the previous reports on the economic, social and health value of culture (see Goemaere et al., 2025a, 2025b and Verhoeven et al., 2024), ensuring that the various sub-reports remain comparable with one another. The reports focus on participation in culture and cultural activities. In addition, they examine cultural participation from a policy perspective, with particular attention to forms of participation that can be supported, encouraged or facilitated by policy and are often – but not necessarily – collective in their nature. Overlap with the previous reports was avoided as far as possible. Studies that re-emerged during the literature review but had already been covered in one of the previous reports, were therefore not included again.

The term 'cognition' has various definitions and interpretations. Some definitions restrict cognition to the mental processes that enable intelligent behaviour, whilst others also include non-conscious perceptual processes, memory processes, the execution of complex motor tasks and/or emotions in the cognitive domain (Damasio, 2000; Jeannerod, 1997; Keijzer, 2016; Neisser, 1967). This report distinguishes between three groups of outcomes relating to the 'cognitive value of culture'. Specifically, these are: (1) the cognitive functioning of individuals (for example, memory, language skills and connectivity between brain regions), (2) cognitive development (creativity being the prime example here) and (3) learning processes (for example, the acquisition of new knowledge or the improvement and expansion of existing intellectual skills or knowledge). What constitutes cognitive value can therefore be interpreted very broadly or, conversely , very specifically. The definition used in this report is based on the themes and effects that emerged from the literature reviewed. However, this does not exclude other effects or processes from also being regarded as forms of cognitive value.

1. Cognitive functioning

The first interpretation of the cognitive value concerns the link between cultural participation and the cognitive skills that enable people to absorb and process information and knowledge. Examples of these include the (episodic and working) memory, perceptual reasoning, visuospatial cognition, executive functions[1], processing speed, cognitive flexibility[2], semantic language ability, cognitive reserve[3] and functional connectivity in the brain[4] (i.e., interaction between the frontal, posterior and temporal brain regions). The central idea of this interpretation is that participation in cultural activities has a positive impact on individuals' cognitive functioning. This positive impact consists both of improving a person's cognitive functioning and of maintaining their cognitive abilities, whilst seeking to prevent or avoid cognitive decline as much as possible (for example, in older people).

Most of the included studies (10 out of 14) relating to cognitive functioning focus on **older adults** (Arab et al., 2021; Brown et al., 2020; Chung et al., 2018; Fancourt & Steptoe, 2018; Fancourt et al., 2018; Ike et al., 2023; Malinin et al., 2023; Mashinchi et al., 2024; Petrovsky et al., 2022; Sugita et al., 2021). Older people are, due to age related physical processes in the body - i.e., the natural decline in cognitive functions resulting from ageing processes - more susceptible to cognitive decline. In practice, and also in research, the focus is therefore often on strengthening their cognitive functions or adopting a preventative approach (i.e., how can we slow down cognitive decline?). Specific cultural interventions and programmes are designed to address these objectives.

In the study by Brown and colleagues (2020), for example, older adults take part in the 'The Mind is a Muscle' programme , in which they spend twelve weeks (2 hours per week) engaging with 'conceptual art'[5], which improves their cognitive flexibility and executive functions. Another example is a programme that involves people with dementia and their

[1] Executive functions comprise a range of essential skills, such as attention and self-control (Kirova et al., 2015).

[2] Cognitive flexibility is the ability to adapt one's response to changing stimuli, and is an essential skill for everyday functioning (Dajani & Uddin, 2015).

[3] Cognitive reserve is the brain's capacity for plasticity, or its ability to efficiently (Stern, 2002; 2013).

[4] The Default Mode Network (DMN) – a network of brain regions that becomes active when we are at rest – connects various brain regions associated with different cognitive processes such as introspection, self-control, prospection, episodic and autobiographical memory, and insight into the emotional states and intentions of others (Buckner & Vincent, 2007; Gusnard et al., 2001; Raichle, 2006).

[5] In this study, 'conceptual art' refers to artistic creation that requires a certain level of cognitive activity (organising and planning; attention and self-monitoring; cognitive flexibility) and where the creation process is not tied to a specific medium (materials are adapted to the idea) (Brown et al., 2020).

informal caregivers in performing arts programmes within their local community (Malinin et al., 2023), which improved the cognitive scores of people with dementia. The informal caregivers themselves reported an improvement in both their own memory and that of the person with dementia for whom they care. More studies on the cognitive functioning of people with a specific cognitive diagnosis or disorder can be found under the medical applications of this first cognitive value (see section 1.2).

Not only interventions have a positive impact on the cognitive functioning of older people, 'ordinary' cultural participation – that is, voluntary cultural participation in everyday life – also has similar effects. A diverse range of cultural activities is beneficial to the cognitive functioning of older people, examples include: being active in an art or music group; dancing; visiting an art gallery, museum, exhibition, film or cinema; attending a lecture, theatre performance, musical, opera or concert; knitting, quilting, sewing, crocheting, painting, drawing, woodwork, making photo albums, doing crafts, working on projects, making jewellery, writing or gardening; reading books, magazines and/or newspapers, etc. However, some older people experience mobility or motivation barriers (Hill & Payne, 2017; Rosenberg et al., 2011) when it comes to physical activities or cognitive training, which are often used preventatively to support the cognitive function of older people (Smith, 2016). In such cases, certain cultural activities – i.e., those requiring little physical activity – offer a worthwhile alternative.

Only one study focuses on **children**'s cognitive functioning and discusses the positive impact of visiting children's museums – and their playful and informal learning environment - on the cognitive development of young children (aged 4–5) (Tan et al., 2021). Preschoolers who visited a children's museum (accompanied by adults) achieved higher cognitive scores in recognising quantities and arithmetic. Three other studies have focused on **adults** (including older adults) as their target group (Bolwerk et al., 2014; Schindler et al., 2017; Soubelet, 2011). These studies show that creating visual art and evaluating it has a positive impact on functional connectivity of the brain (Bolwerk et al., 2014), a person's processing speed and visuospatial cognition (Schindler et al., 2017). Although Bolwerk and colleagues (2014) suggest that creating art oneself is more beneficial, Schindler and colleagues (2017) found no difference in cognitive effects between creating art oneself and merely evaluating and discussing art.

Finally, Soubelet's (2011) study does not focus on the unequal distribution of cognitive functions across age groups (older people experience some decline in this regard, whilst children are still developing), but emphasises the **differences in educational attainment** in

this respect. Among adults , a higher level of education is associated with higher levels of cognitive functioning (Aartsen et al., 2002; Arbuckle et al., 1986; Chan et al., 2021; Reynolds et al., 2002; Rosselli et al., 2022; Stern, 1994; 2021), whilst a lower level of education constitutes a risk factor for dementia (Brayne et al., 2010; Callahan et al., 1996; Qiu et al., 2001; Stern et al., 1994). Participation in intellectual and cultural activities (theatre, cinema, museums, zoos or other cultural outings; popular events; studying or practising a religion; meditation; practising art (painting, drawing, etc.); surfing the internet; crossword puzzles; sudoku; reading; taking classes) compensates for the lower cognitive ability associated with a lower level of education (Soubelet, 2011). This is a *moderating effect*: the cognitive benefit of participating in intellectual and cultural activities is greater for people with a lower level of education than for those with a higher level of education. In the study, those with a lower level of education who took part in such activities achieved cognitive scores as high as those with a higher level of education. In this way, cognitive differences based on educational attainment are offset by participation in intellectual or cultural activities. It is true, however, that the differences in educational attainment are smaller amongst people who do spend (more) time on intellectual and/or cultural activities. A possible *selection effect* – i.e., those with lower educational attainment who participate in cultural activities differ from those with lower educational attainment who do not - can therefore not be entirely ruled out.

With the exception of one study, all the included studies (13 out of 14) report a **positive association** between cultural participation and individuals' cognitive functioning. Chung and colleagues (2018) investigated the effect of playback theatre on the cognitive functioning and well-being of older people. No statistically significant for this theatre intervention association with cognitive functioning was found. Possible explanations for the absence of such an association include the fact that playback theatre is different, more fluid and improvisational compared to conventional theatre, and is not, or at least less, focused on specific cognitive aspects – i.e., there is no script or need to memorise lines –, meaning that memory enhancing effects are absent.

The results regarding the importance of the **frequency** of cultural participation – how often people take part in a particular cultural activity - for its positive impact on cognitive functioning are mixed. Several studies show that frequent participation is not important or is of little relevance, and that the positive association between cultural participation and cognition is independent of how often one participates (Fancourt & Steptoe, 2018; Fancourt et al., 2018; Ike et al., 2023; Sugita et al., 2021). On the other hand, Fancourt and colleagues (2018) do state that, in the case of museum visits, people should do so at least every few

months in order to achieve a lower incidence of dementia. Furthermore, in the study by Ike and colleagues (2023), there was also no significant difference in cognitive functioning between those who rarely (i.e., once a month or less) attended an arts event (e.g., art museum/gallery/fair, craft fair, live performance (concert, play or lecture) or film screening) and those who never attend arts events.

In general, the included studies make it clear that cultural participation is positively associated with individuals' cognitive functioning. It is important to note, however, that not all studies allow for causal interpretations, as self-selection could not be sufficiently ruled out. It is also possible that individuals who already have better cognitive functioning are more likely to participate in certain cultural activities. Previous research has shown that individuals with high cognitive functioning have a preference for participating in cognitively stimulating activities (Aartsen et al., 2002), and that older adults with high cognitive functioning also participate more frequently in these kinds of activities (Fung et al., 2011). Some of the included studies put forward similar lines of reasoning as possible explanations for the positive association between cultural participation and individuals' cognitive functioning. They suggest that participants may already have been interested in certain cultural activities (Schindler et al., 2017) or may exhibit certain personality traits, such as empathy, compassion and openness to experiences and perspectives, which are correlated with a higher level of activity and thus also with better cognitive functioning (Hogan et al., 2012; Petrovsky et al., 2022). However, other studies find evidence that the observed association cannot be fully explained by such selection effects. Arab and colleagues (2021), for example, argue that people with better cognitive health do not participate more frequently in cognitively stimulating activities, such as art or music activities. Furthermore, the positive association between cultural participation and cognition persisted in various studies *after* taking into account social factors such as an individual's social network, civic and community engagement, other leisure activities, voluntary work, etc. (Fancourt & Steptoe, 2018; Ike et al., 2023).

Table 1: Summary of included studies relating to cognitive functioning

Author (year)	Research method	Key findings
Arab et al. (2021)	Quasi-experimental longitudinal survey research	Moderately intense physical activity and learning activities (art and music lessons in (evening) education) have a positive impact on the cognitive function (memory) of older adults (aged 50 and over).
Brown et al. (2020)	Case study Mixed-methods research • Quasi-experimental research (neuropsychological test and survey data) • Interviews	Participation in a conceptual art and cognitive health programme led to significant improvements in executive functions and measured cognitive flexibility among older adults (aged 61-86). Changes in their self-reported cognitive flexibility and cognitive reserve were not statistically significant.
Fancourt & Steptoe (2018)	Longitudinal survey research	Attending exhibitions (art galleries, museums) and live performances (theatre, concerts, opera) is beneficial for memory and semantic fluency. The impact of cinema is smaller.
Fancourt et al. (2018)	Longitudinal survey research	Older adults (aged 50 and over) who visit museums every few months or more frequently have a lower incidence of dementia after ten years than less frequent visitors.
Ike et al. (2023)	Longitudinal survey research	Older adults (aged 55 and over) who attend art events have higher cognitive scores than those who do not. This association is independent of how often such events are attended and remains significant after controlling for various demographic variables and baseline cognitive scores.
Malinin et al. (2023)	Case study Mixed-methods programme evaluation • Longitudinal survey • Interviews • Observations	Participation in a community-based symphony, dance or theatre programme (together with their caregiver) improves the cognitive scores of people with dementia. Caregivers experience - both for themselves as well as for their partner with dementia - a positive impact on their memory.

Mashinchi et al. (2024)	Cross-sectional survey research	Participation in craft and art activities plays a role in maintaining cognitive function and building cognitive reserve in older adults (aged 67-89 years).
Petrovsky et al. (2022)	Cross-sectional survey research	Older adults (average age of 72 years) who attend art activities demonstrate better cognitive functioning, and participation is associated with a slower decline in cognitive function.
Sugita et al. (2021)	Longitudinal survey research	Engaging in intellectual and creative activities reduces the risk of cognitive impairment in older adults (aged 65 and over). No such association was found for traditional Japanese cultural activities.
Tan et al. (2021)	Experimental survey research	Visiting a children's museum promotes the development of cognitive abilities in pre-school children (aged 4-5).
Bolwerk et al. (2014)	Experimental research involving epidemiological (fMRI) and psychological statistical data analysis	Active participation in group based visual arts activities improves the functional connectivity of the Default Mode Network, particularly between the frontal, posterior and temporal brain regions among recently retired individuals (associated with psychological resilience). These effects were not observed in participants in a group for cognitive art evaluation.
Schindler et al. (2017)	Quasi-experimental survey research	Participation in mentally stimulating art interventions (creating visual art and cognitively evaluating art) leads to improvements in processing speed and visuospatial cognition.
Soubelet (2011)	Cross-sectional study using cognitive test and survey data	Participation in intellectual and cultural activities reduces the differences in cognitive ability between highly and low-skilled adults.
Chung et al. (2018)	Case study Quasi-experimental longitudinal survey research	Older adults (aged 50 and over) who take part in playback theatre experience significant improvements in their (emotional) well-being. There were no significant changes in cognitive functioning.

1.1. Possible explanations for the link between culture and cognitive functioning

The studies included on this first cognitive value of cultural participation offer various possible explanations or identify potential mechanisms that are (partly) responsible for the positive association between cultural participation and individuals' cognitive functioning. These explanations are, in each case, suggestions based on previous (experimental) research, but were not (experimentally) tested in the authors' own research. The most common possible explanations are discussed below. An overview of the other explanations for the positive association between cultural participation and individuals' cognitive functioning, which appeared only once in the included studies within this value, can be found in the appendix of this report (see Table 6 in Section 5).

The **social aspects** of cultural participation are one of the most common explanations cited in the studies included within the area of cognitive functioning as a value of culture (Brown et al., 2020; Fancourt & Steptoe, 2018; Fancourt et al., 2018; Schindler et al., 2017; Sugita et al., 2021). Both active and receptive cultural participation are inherently social, promote social interactions and increase the likelihood of experiencing social support. Social activity and engagement support individuals' resilience, which protects against cognitive decline (James et al., 2011; Rafnsson et al., 2020). Both social engagement and interactions are associated with a lower risk of dementia (Hindle et al., 2016; Sugita et al., 2021). Cultural activities usually take place in settings where other people are present and often require social contact, even when participants attend alone (Fancourt & Steptoe, 2018; Fancourt et al., 2018). When visiting a museum, for example, even if people come alone, spontaneous social contact arises with museum staff and/or other visitors (Fancourt et al., 2018). Furthermore, they often take place within a group setting, which offers participants new contacts outside their familiar environment and strengthens social bonds, while also leading to cognitive improvements in certain functions such as processing speed and visuospatial cognition (Schindler et al., 2017). Further information on the (effects of the) social aspects of cultural participation can be found in the report on the social value of culture (Goemaere et al., 2025b).

A second explanation for cognitive functioning as a cognitive value of culture relates to the **cognitive reserve theory** (Fancourt & Steptoe, 2018; Fancourt et al., 2018; Ike et al., 2023; Mashinchi et al., 2023; Petrvosky et al., 2022). This theory posits that complex and stimulating experiences foster neuroplasticity and thus enhance the neural structure and brain function. In this way, they offer a protective effect against neurodegeneration or

cognitive decline (Stern, 2002, 2012; Stern et al., 1999; Wu et al., 2016). Examples of factors that build up this cognitive reserve include education, occupational complexity and participation in physical, cognitive and social activities (Stern, 2002, 2012; Stern et al., 1999), and therefore also cultural participation, as evidenced by these studies. Cultural participation provides a stimulating environment that activates certain cognitive processes and, in doing so, engages bilateral neural circuits. In the case of active cultural participation, such as writing, painting and craft activities, cognitive reserve is enhanced by maintaining current neuronal function, creating new neuronal connections, stimulating neuronal growth and recruiting new, alternative neural pathways (Horikawa et al., 2021; Park et al., 2019; Mashinchi et al., 2024; Roberts et al., 2015; Vance et al., 2012; Wang et al., 2022). Furthermore, participation in cultural activities, such as visiting a museum for example, enhances or maintains a person's cognitive reserve through a combination of neural and sensory stimulation and cognitive engagement (Stern, 2012).

The **'use-it-or-lose-it' hypothesis**, or **disuse syndrome**, offers a third possible explanation for the positive association between cultural participation and individuals' cognitive functioning (Fancourt & Steptoe, 2018; Fancourt et al., 2018; Ike et al., 2023; Mashicnhi et al., 2024). This hypothesis posits that a lack of (cognitive) stimulation in a person's daily life leads to a more rapid decline and deterioration of their cognitive functioning (Hultsch et al., 1999). Neurodegenerative and cognitive decline accelerate in the absence of stimulating stimuli (Hultsch et al., 1999; Fancourt & Steptoe, 2018). Cognitive or intellectually stimulating activities – particularly those involving the processing of new information, such as visiting galleries, museums, concerts, theatres and the opera, or attending other arts events – are associated with positive changes in cognitive functioning (Hultsch et al., 1999; Iizuka et al., 2019; Fancourt & Steptoe, 2018).

Furthermore, processes of **arousal** and the **hedonistic tone** (i.e., the extent to which we experience certain stimuli as pleasant or unpleasant) during cultural participation have positive effects on participants' cognitive functions (Fancourt & Steptoe, 2018; Fancourt et al., 2018). Participation in cultural activities enhances emotions and reduces stress (Fancourt & Steptoe, 2018). Participation in cultural activities is associated with positive emotions (Johnson et al., 2017). By increasing dopamine levels in the brain, positive emotions in turn improve cognitive flexibility (Ashby et al., 1999). When people enjoy cultural activities, this leads to stronger feelings of excitement, which in turn results in improved cognitive performance (Thompson et al., 2001). Stress is linked to accelerated cognitive decline due to weakened prefrontal networks, a reduced systolic blood pressure response or elevated

cortisol levels (Arnsten, 2015; Pulopulos et al., 2014; Yano et al., 2016). Psychological and biological empirical research demonstrates that participation in cultural activities reduces stress (Fancourt & Williamon, 2016).

Finally, it is also plausible that cultural participation brings about such positive cognitive effects because it is a **multimodal activity** that engages people physically, cognitively and socially, and combines various cognitively stimulating factors (i.e., intellectual stimulation, light physical activity, positive emotions, relaxation and social engagement through interaction) (Fancourt et al., 2018; Petrovsky et al., 2022).

1.2. Medical applications

1.2.1. People with cognitive disorders

The first cognitive value of culture discussed in this report is also applied within a medical context. This involves using cultural participation to improve or maintain the cognitive functioning of people with cognitive disorders, both within the community (Eekelaar et al., 2012; Lee et al., 2019; Luo et al., 2023; Mahendran et al., 2018; Masika et al., 2021; 2022; Polihronis, 2022; Tang et al., 2020; Valdes et al., 2019; Yan et al., 2021; Young et al., 2015; Yu et al., 2021) as well as in clinical settings, such as a hospital (Danila et al., 2018; Sangvanich et al., 2023; Wang & Xiao, 2021) or a medical centre (Lin et al., 2022). Apart from a few exceptions (Tang et al., 2020; Wang & Xiao, 2021) or studies with a mixed target group (Danila et al., 2018; Polihronis, 2022), the remaining studies included within this review of the cognitive value of culture focus on people with a cognitive disorder. These are primarily people with (mild) cognitive impairment. In addition, a few studies describe the cognitive effects of cultural participation among people with dementia (Young et al., 2015), delirium (Danila et al., 2018) or another cognitive impairment (Polihronis, 2022). When research focuses more on such health dynamics, we often see in the included studies – and this is typical of such research in the medical sciences – a smaller number of respondents and a few case studies.

A similar effect is also found in medical applications: cultural participation improves the cognitive functioning of individuals with a (mild) cognitive impairment or another cognitive disorder. A notable difference compared with non-medical applications is that this does not involve 'spontaneous' cultural participation. In all the studies, cultural participation takes the form of a structured **programme** or an **intervention** (Danila et al., 2018; Eekelaar et al., 2012; Lin et al., 2022; Luo et al., 2023; Sangvanich et al., 2023; Tang et al., 2020; Valdes et al.,

2019; Young et al., 2015) or of an art and/or music **therapy** (Lee et al., 2019; Mahendran et al., 2018; Masika et al., 2021; 2022; Polihronis, 2022; Wang & Xiao, 2021; Yan et al., 2021; Yu et al., 2021).

People with a **mild cognitive impairment** are a common target group when cultural participation is used as a medical intervention to alleviate or prevent the risk of a decline in their cognitive functioning. A mild cognitive impairment (MCI) is a transient and intermediate stage between normal cognitive ageing and dementia, characterized by greater cognitive decline than would be expected given a person's age and educational level, whilst daily functioning remains largely intact (Albert et al., 2011; Cooper et al., 2013; Gauthier et al., 2006; Petersen, 2000; Petersen et al., 2014; Roberts et al., 2014). Typical symptoms include, amongst other things, impairments in episodic memory, working memory and executive functions, as well as increased difficulty in carrying out daily tasks (Albert et al., 2011; Huntley & Howard, 2010). It is associated with an increased risk of progression to dementia (Lindbergh et al., 2016; Petersen et al., 2018). Participants in cultural interventions or programmes and organised sessions involving art or music therapy are often – if not exclusively – older (aged 50 and over). Also, mild cognitive impairment is a stage of cognitive decline in which it is still possible to intervene and reverse the (direction of future) decline (Mahendran et al., 2018; Petersen et al., 2014). Furthermore, non-pharmacological interventions, such as (visual) art therapy, form the basis for the support of people with mild cognitive impairment (Masika et al., 2021). These two elements, combined with the reported positive effects of cultural participation on the cognitive functioning of people with mild cognitive impairment illustrate the potential of cultural participation to prevent or overcome age-related cognitive decline. Cultural participation helps to preserve the cognitive abilities of this group and the progression towards dementia, even when their mild cognitive impairment has not (yet) been clinically diagnosed (Lin et al., 2022). Studies that followed patients over a short (up to 3 months) and long (6 months to one year) period showed that the effects persisted throughout the follow-up period (Lee et al., 2019; Lin et al., 2022; Masika et al., 2022).

In some studies, a similar positive functioning has also been found impact of cultural participation on cognitive among people with **dementia** (Eekelaar et al., 2012; Young et al., 2015). Dementia is characterised, amongst other things, by a significant impairment of cognitive abilities. Participation in an art intervention – both viewing and creating or discussing works of art in an art gallery – improves cognitive functions relating to episodic memory and verbal fluency (Eekelaar et al., 2012; Young et al., 2015). During such

interventions, for example, participants experience fewer speech disruptions and engage more in semantic clustering[6] and recalling memories from the past (Young et al., 2015).

A few studies are considered as exceptions since they do not focus (exclusively) on individuals with a (mild) cognitive impairment or dementia. Polihronis (2022), for example, describes how creating art offers therapeutic benefits for a 10-year-old girl with the cognitive functioning of someone much younger, who is also blind, has limited fine motor skills and suffers from a life-limiting degenerative neurological condition. Another example is the study by Danila and colleagues (2018), which shows that older hospital patients – both those with and without symptoms of delirium[7] on admission – who were visited by someone who read them a story or a poem and discussed it with them, experienced less delirium during their stay than those who did not experienced this. Only two studies use cultural participation to address the cognitive functioning of people with a mental – and therefore a not cognitively related – health problem. In the study by Wang and Xiao (2021), the distorted cognition of anorexia patients regarding their eating and body shape was addressed through a combination of music or art therapy and cognitive behavioural therapy. Tang and colleagues (2020) investigated the impact of theatrical improvisation on social cognition[8] (emotional processing, theory of mind, social skills and attribution style) in young people at clinical risk of psychosis, but found no significant effects. Further information on the value of culture for individuals' mental health and social skills can be found in the reports on the health value (Goemaere et al., 2025a) and the social value (Goemaere et al., 2025b) of culture.

Table 2: summary of included studies on the medical applications of culture for cognitive functioning

Author (year)	Research method	Key findings
Lee et al. (2019)	Experimental research	Taking part in art therapy sessions has a positive impact (both short-term and long-term) on the general cognitive functioning and memory of older people (aged 60-85) with mild cognitive impairment.

[6] In the study by Young and colleagues (2015), semantic clustering was defined as the use of two or more semantically related words or concepts with no more than one word between them.

[7] Delirium is an acute change or fluctuation in a patient's mental state, combined with inattention and disorganised thinking or an altered level of consciousness (Inouye et al., 1990).

[8] People at clinical risk of psychosis – and who therefore exhibit symptoms consistent with the psychosis spectrum (Green et al., 2008; Gur & Gur, 2016) – often have impaired social cognition and experience difficulties in emotional processing, theory of mind, social skills and a bias in their attribution style (Green et al., 2008; Lee et al., 2015).

Lin et al. (2022)	Experimental research	The CrEAS programme (Creative Expressive Arts-based Storytelling) has a positive impact on cognitive functioning (primarily short-term memory) in older adults (aged 60-85) with mild cognitive impairment.
Luo et al. (2023)	Experimental research using rs-fMRI and survey data	Participation in the rEAP programme (remote Expressive Arts Programme) improved the cognitive function of patients with mild cognitive impairment (aged 60 and over). Changes in spontaneous brain activity and brain network connections help to improve and maintain their cognitive function.
Mahendran et al. (2018)	Experimental research	Art therapy improves cognitive functioning (memory, attention, visuospatial ability and executive functions) in older adults (aged 60-85) with mild cognitive impairment.
Masika et al. (2021)	Mixed-methods research • Experimental study • Focus groups	Participation in visual art therapy improves the cognitive functioning of older adults (aged 60 and over) with mild cognitive impairment who have low or no literacy skills. Participation in health education activities has a similar effect.
Masika et al. (2022)	Experimental research	Participation in visual art therapy improves the cognitive functioning of low- or non-educated older adults (aged 60 and over) with mild cognitive impairment.
Sangvanich et al. (2023)	Mixed-methods research • Experiment, survey • Content analysis • Interviews	Taking part in weekly art activities improves cognition, aesthetic skills and quality of life in older people (aged 55 and over) with mild cognitive impairment.
Valdes et al. (2019)	Case study, interviews	Guided group-based art activities improve the quality of life of older adults (aged 54-90) with mild cognitive impairment in terms of social interaction, enjoyment and mental stimulation (cognitive functions: memory and concentration).
Yan et al. (2021)	Quasi-experimental survey research	Expressive art therapy is a feasible and effective intervention for older adults (aged 64-72) with mild

		cognitive impairment, with beneficial effects on general cognitive function, language skills, anxiety, depression and quality of life.
Yu et al. (2021)	Quasi-experimental research using physiological (MRI) and survey data	Participation in art therapy leads to cognitive (working and short-term memory) and associated neuroplastic (cortical thickness) improvements in older adults (aged 60-85) with mild cognitive impairment.
Eekelaar et al. (2012)	Content analysis • Audio recordings • Interviews	The episodic memory and verbal fluency of people with dementia (aged 50 and over) improve during participation in a visual arts intervention at an art gallery.
Young et al. (2015)	Case study, content analysis of audio recordings	People with dementia (aged 60 and over) experience a positive impact on their verbal fluency (speech disruptions/stuttering and semantic clustering) when viewing and creating art in an art gallery.
Polihronis (2022)	Descriptive case study	The introduction and adaptation of art therapy, even in unconventional cases, is beneficial for the cognitive and emotional well-being of the those involved.
Danila et al. (2018)	Quasi-experimental research using observational and survey data	Listening to and discussing a story or a poem leads to a reduction in cases of delirium and symptoms in older (aged 65 and over) hospital patients.
Wang & Xiao (2021)	Mixed-methods experimental research • Interviews • Survey • Physical tests	Music and art therapy combined with cognitive behavioural therapy helps adolescent anorexia patients to develop healthy cognitive patterns (thinking about food and body shape). It also has a positive impact on self-acceptance, therapeutic outcomes and weight gain.
Tang et al. (2020)	Quasi-experimental mixed-methods research • (Survey) interviews • Focus groups	Participation in the TIPS programme (drama and cognitive behavioural therapy) does not lead to improvements in (social) cognition, emotion recognition, and emotional and age differentiation among young people (aged 14–25) with a clinical risk of psychosis.

1.2.2. Possible mechanisms underlying the effects of cultural participation on cognitive functioning among medical target groups and in medical contexts

The included studies in which cultural participation is used to improve cognitive functioning – whether in a medical context or amongst a medical target group (i.e., people with a (cognitive) condition) – again mention various possible explanations and mechanisms for its potential positive effects.

One common explanation is that cultural activities provide **multifaceted cognitive stimulation**, as they engage multiple cognitive processes simultaneously (Lin et al., 2022; Luo et al., 2023; Masika et al., 2021; 2022; Yan et al., 2021; Young et al., 2015; Yu et al., 2021). Various aspects of art, for example, are cognitively stimulating. It involves processes such as planning, decision-making, cognitive control, abstract and associative thinking, attention, (long-term) memory, verbal fluency, executive control and other processes that require fine motor and sensory coordination, visual (spatial) memory and executive functions (Akhoondzadeh et al., 2014; Bichot et al., 2019; Calleo et al., 2012; Lin et al., 2022; Masika et al., 2022; Safar, 2014; Voelcker-Rehage, 2008). During art lessons, participants learn to concentrate, listen attentively, follow instructions and actively participate in the learning process (Masika et al., 2021; Safar, 2014). In addition, making or creating art itself (drawing, for example) stimulates their fine motor skills, coordination, visuospatial memory, abstract thinking and executive functions. Finally, sharing the story behind their artwork and its meaning in a group setting enhances, amongst other things, language skills and self-expression, memory, abstract thinking, and executive control (Alain et al., 2019; Masika et al., 2021; Safar, 2014). The presence of various components, the high cognitive complexity and the numerous opportunities for creativity available to participants increase the likelihood of cognitive benefits (Lin et al., 2019; Luo et al., 2023; Yan et al., 2021; Zhao et al., 2018). Art therapy also makes intensive use of executive functions, visuospatial and social-cognitive processing, and it involves increased use of memory-related strategies such as encoding and retrieval strategies (Yu et al., 2021).

The artistic perception adressed during cultural participation is therefore stimulating because it activates processes in various regions of the brain (Zaidel, 2010). A second mechanism that emerges in several of the included studies is therefore the **physiological stimulation or neural activity** observed in participants during cultural activities (Eekelaar et al., 2012; Lee et al., 2019; Luo et al., 2023; Mahendran et al., 2018; Masika et al., 2021; 2022; Sangvanich et al., 2023; Young et al., 2015; Yu et al., 2021). Viewing art, for example, leads to

an increase in neural activity (Kawabata & Zeki, 2004; Zeki, 1999). Furthermore, the cognitive processes described above contribute to the activation and/or development of certain brain regions and to the brain's neuroplasticity (Eekelaar et al., 2012; Luo et al., 2023; Mahendran et al., 2018; Sangvanich et al., 2023; Yu et al., 2021); the improvement of (functional) connectivity between brain regions (Lee et al., 2019; Luo et al., 2023; Mahendran et al., 2018; Masika et al., 2022); the activation and/or improvement of the coordination between certain networks in the brain (Lee et al., 2019; Luo et al., 2023; Masika et al., 2021; 2022); and the increasement in efficiency of certain cognitive processes in the brain (Luo et al., 2023). The general idea behind this possible explanation is that such physiological changes in the brain are responsible for the improved cognitive functioning observed in participants in cultural activities, such as art programmes and art therapy.

On the other hand, explanations are also put forward which – rather than merely cognitive and physiological stimulation of the brain – are specific to cultural participation. Forms of cultural participation that involve an **aesthetic stimulus** or aesthetic **experience** improve the cognitive functioning of the person experiencing them (Eekelaar et al., 2012; Valdes et al., 2019). Viewing and experiencing aesthetic stimuli (in visual art or painting, for example) activates cognitive and neurological processes alongside emotional processes (Eekelaar et al., 2012; Leder et al., 2004). Visual art, for instance, elicits both an emotional and a cognitive response in the observer (Camic, 2008; Kreitler & Kreitler, 1984; Leder et al., 2004). Activities that stimulate aesthetic experience and meaningful emotions, linked to a sense of beauty, facilitate the recall of past memories through the sensory input they provide (Seifert et al., 2017).

According to others (Lee et al., 2019; Masika et al., 2022; Sangvanich et al., 2023; Young et al., 2015), the aesthetic stimulus in itself (such as viewing art) is not sufficient. According to them, discussing and **reflecting** on matters such as art is essential for the positive impact of cultural participation on individuals' cognitive functioning. These additional elements of cultural programmes, on top of the cultural activity itself (such as viewing or creating art), stimulate mental flexibility and memory, which in turn activates various regions of the brain (Adnan et al., 2019; Masika et al., 2022; Ritter & Mostert, 2017). Looking at an image and reflecting on it stimulates thinking skills (Desantis & Housen, 2000). Furthermore, discussing works of art encourages participants to recall events and stories from the past (Lee et al., 2019; Young et al., 2015). Through making connections with the past and integrating these into the creative process, participants practise thinking skills and it stimulates their (long-term) memory and keeps them participants cognitively active (MacPherson et al.,

2009; Masika et al., 2022; Sangvanich et al., 2023; Sittironnarit, 2011). Through memory stimulation and the **linking of memories**, cultural participation has positive effects on participants' cognitive functioning.

Some of the studies also note that **variation in materials or activities** (i.e., different cultural activities within a single programme or intervention) is a determining factor in the occurrence of (certain) cognitive effects (Luo et al., 2023; Yan et al., 2021). The use of diverse materials helps to stimulate creativity and to foster more complex and varied forms of artistic expression, which in turn is associated with improved cognitive functions (Yan et al., 2021). For example, the texture and fluidity of art materials have different effects on cognitive processes (Lusebrink et al., 2013). With regard to the idea of diverse activities, Masika and colleagues (2020) argue that programmes which incorporate only one art form lack the fundamental mechanisms of cognitive stimulation, such as creativity and reflection.

Finally, **social factors** such as social contact and socialisation are once again cited as a possible explanation for the positive cognitive changes following cultural participation (Eekelaar et al., 2012; Masika et al., 2021; Ruthirakuhan et al., 2012). Further information on this can be found in the report on the social value of culture (Goemaere et al., 2025b). This illustrates, as was also noted in the other reports, that whilst the various values of culture can be analytically distinguished, in practice they often overlap and exhibit spillover effects.

2. Cognitive development – creativity

The second interpretation of the cognitive value of cultural participation concerns the link between cultural participation and individual **creativity**. Creativity is a concept that has various interpretations. Based on the different definitions used in the studies included in this report, we define creativity as 'the ability and process whereby individuals or groups, in interaction with their environment, generate and realise new and original ideas, solutions or products that are considered valuable, appropriate or useful within a given context' (Amabile, 1983; 1996; Amabile et al., 1996; Csikszentmihalyi, 1997; El Murad & West, 2004; Guilford, 1967; Kaufman & Beghetto, 2009; Kaufman & Sternberg, 2019; Lubart, 1999; Plucker et al., 2004; Rhodes, 1961; Runco & Jaeger, 2012; Stein, 1953; Sternberg & Lubart, 1995; Wehner et al., 1991; Weston & Stoyles, 2010; Yeh et al., 2019). The essence of creativity is that creative outcomes are both original – that is, new and unique (Torrance, 1970; 1988) – and useful or meaningful (Dudek, 1973). Creative behaviour consists of the actions an individual takes to realise their ideas (Cabra & Uribe-Larach, 2020). Examples of cognitive

creative skills include: generating ideas, defining problems (recognising and structuring them), divergent thinking[9], making innovative connections and associations, complex thinking skills (understanding, interpreting and problem-solving), etc. Examples of more affective components within creative thinking include: self-discipline, courage, curiosity, doubt, flexibility, an interest in learning, a willingness to try new things, etc.

Creativity is influenced by various factors. One example of a factor that accounts for individual differences in creativity is the **cultural values** that people hold (Gong et al., 2023). Individuals who are long-term oriented experience greater pleasure and fulfilment during a creative process than short-term thinkers (Bearden, 2006; Gong et al., 2023). Individuals who think in the long term and have a holistic perspective on time therefore attach importance to both the past and the future (Bearden, 2006). On the one hand, this value is positively associated with creativity: individuals with a long-term orientation are more likely to be creative (Hong et al., 2018; Kittová & Dušan, 2018). On the other hand, they experience a greater sense of enlightenment and inspiration during creative processes and derive more pleasure and satisfaction from them (Gong et al., 2023). Creativity is **distributed unequally across society**. It is partly passed down across generations and is also closely linked to individuals' academic performance (Gajda, 2016; Jindal-Snape et al., 2018) and the educational attainment and socio-economic status of a person's parents (Castillo-Vergara et al., 2018; Dai et al., 2012; Runco et al., 2017). According to Briguglio and colleagues (2022), more can therefore be done to bridge the gap between creative and less creative individuals. Cultural participation, it appears, offers a way to address this. The focus of this second value is therefore on the value that cultural participation holds for individuals' creativity. This encompasses both the impact of cultural participation on individuals' artistic creativity and on their more cross-domain and non-artistic creativity, which are discussed below.

2.1. Artistic creativity

Some of the studies included in this report confirm the positive impact that cultural participation has on individuals' artistic creativity, or on the creativity they apply **within the cultural sphere** in which they are active. Sovansky and colleagues (2016), for example, identify domain-specific effects of musical experience on creativity that are related to the musical domain. Their research shows that the activities a person engages in within their

[9] Divergent thinking involves generating diverse ideas, responses or solutions by making unexpected combinations, drawing distant connections and applying information in surprising ways (Cropley, 2006).

own domain of cultural expertise are significantly correlated with creativity within that same domain. Creating musicians differ from non-musicians and from musicians who merely perform. Specifically, the researchers state that experts or experienced musicians who create music themselves (improvising, composing and arranging) exhibit stronger divergent thinking patterns than non-experts and musicians who exclusively perform existing music. Those who create music, regardless of the number of years' musical experience, are better able to think divergently than those who do not create music. On the other hand, Ishiguro and Okada (2020) show that receptive cultural participation – in their study viewing art – can stimulate creativity and encourage people to create art themselves, for example through painting. Furthermore, this creativity applies not only to the disciplines mentioned, such as music and painting, but also to other artistic fields such as dance and photography, for example (Ishiguro & Okada, 2018; Nakano et al., 2017; Parker, 2008; Pavlou, 2013; Wellman, 2012). Finally, research by Varl and Herzog (2021) showed that the integration of contemporary artistic practices into a primary school's curriculum had a positive effect on pupils' artistic creativity, including their sensitivity to artistic problems, elaboration, flexibility, fluency and originality.

2.2. Cross-domain and non-artistic creativity

Creativity stems from an interplay of general psychological characteristics such as skills, aptitudes, traits, tendencies, motivations and behaviours (Plucker, 1988). For a long time, there was debate as to whether these characteristics constitute a **general creative capacity** that can be applied across various domains – such as science, technology or professional life – or whether creativity and its underlying characteristics differ depending on the specific domain (Baer, 1998).

The studies discussed above in section 2.1 demonstrate that cultural participation can foster cultural or artistic creativity. However, the majority (18 out of 21) of the included studies focus on the significance of culture (and cultural participation) for individuals' cross-domain creativity and/or for creativity in specific domains or tasks that are not directly artistic or cultural in nature. These studies show that creativity stimulated by a cultural experience can transcend the original domain and, for example, be applied in a work environment or a more professional context (An & Youn, 2018). For example, appreciating art can not only contribute to generating more creative ideas, but also provide support for more practical and business-related tasks (such as product design or brandnaming). Creativity in itself is therefore not always the ultimate goal. It can be applied in a variety of

contexts, such as businesses and educational settings, but also as a means to achieve other objectives. Kim (2015), for example, investigated how creative activities contribute to adolescents' resilience when processing trauma at school. Further information on the value of culture for individuals' mental resilience can be found in the report on the health related value of culture (Goemaere et al., 2025a).

2.2.1. Arts education in informal learning environments to promote cross-domain and non-artistic creativity

Arts education is often used in informal contexts to foster creativity. Examples of such environments from the studies included under this cognitive value are **arts centres** (Hoffmann et al., 2021) and **museums** (Gong et al., 2020; Zheng et al., 2021). Here too, arts based cultural programmes provide a means of enhancing participants' creativity (Hoffmann et al., 2021). Art has a positive impact on artistic creativity and creativity in everyday life by stimulating creative thinking and an innovative mindset (Winner et al., 2014). Children, for example, have an innate tendency to create and engage in creative activities, but they also need a stable and supportive environment to realise this potential (Shonkoff & Phillips, 2000). In addition to formal education, a place such as a (children's) museum, where they can express themselves freely, play and explore, provides such an environment (Gong et al., 2020). (Children's) museums provide a unique environment in which children, parents and relevant professionals work together to increase children's interest, motivation and engagement in creative activities (Mayfield, 2005). It is also a place where the child is generally given a central place in the learning process. Moreover, informal learning environments such as children's museums are important for families who cannot afford other investments in creativity (through formal education such as out of school arts education) (Black et al., 2017; Howard, 2013).

Influencing factors

Cultural participation in an informal learning environment, such as a museum, does not automatically lead to an improvement in participants' creativity. For this to happen, it is important that the activity aligns with their interests and actively encourages them to create and experiment (Zheng et al., 2021). Such an **interest-driven approach** seeks to stimulate participants' curiosity and intrinsic motivation and encourages them to develop their own ideas (Chan et al., 2018). Participants must be given sufficient freedom and time to pursue their own interests, without the creative process being constantly interrupted or heavily

directed (Mayfield, 2005). The opportunity to choose their own topics, questions or problems can strengthen their motivation to identify problems and devise possible solutions (Maslow, 2013; Yan, 2005). Furthermore, interactive, participatory and hands-on exhibitions and projects, which give room for experimentation and free play, can foster the development of creativity (Gong et al., 2020; Russ, 2003).

2.2.2. Art education in formal educational settings to promote cross-domain and non-artistic creativity

Arts education is also used in formal educational contexts to foster creativity. The following section discusses how cultural participation within various formal educational settings can contribute to participants' cross-domain and non-artistic creativity. It should be noted, however, that in formal educational settings, self-selection – which is usually present in spontaneous cultural participation outside an educational context – is less prevalent here. Consequently, the effectiveness of arts education in an educational context cannot be directly compared with that of cultural participation during leisure time. Finally, this report also highlights a number of factors that are important when organising arts education aimed at stimulating creativity.

Art education is provided from as early as **nursery school**, and creativity is encouraged in young children. Unlike at a later age, creativity in children consists mainly of elements such as fantasy, imagination, curiosity and originality (Arasteh, 1968; Vygotsky, 2004). Studies show that both arts education in the form of a collaborative project between teachers and professional artists, and the use of arts-based methods to address other educational issues, stimulate the creativity of nursery school pupils (Hui et al., 2015; Kalafati et al., 2025). Early childhood is regarded by many as the golden period for the development of creativity due to the intensive development of the brain and its greater capacity to adapt to changes during this phase (Gardner, 2008; Shonkoff & Phillips, 2000).

However, arts education also continues to stimulate pupils' creativity following the transition to **primary school**. The inclusion of cultural participation – whether as part of the general curriculum (Cheng et al., 2022) or as a cultural intervention within an existing subject (such as dance improvisation in physical education) (Sowden et al., 2015) - is beneficial for creative cognitive processes and enhances the creativity of primary school pupils. Furthermore, embedding arts education activities within the school curriculum is a cost-effective and efficient way of strengthening the creativity of primary school children and also has benefits beyond the artistic domain.

Not only pre-schoolers and children benefit from arts education in terms of their creative abilities, arts education also stimulates the development of creativity among young people in **secondary education**. This can, once again, be integrated into the existing curriculum, such as through the use of certain theatre-based methods to promote creative practices amongst pupils (Munk et al., 2024). Furthermore, arts-based programmes offered as a supplement to the curriculum are an effective way of enhancing the creativity of young people in secondary education (Briguglio et al., 2022; Egana-delSol, 2023). Creativity in adolescents comprises associative and figurative thinking, creative imagination, artistic observation and self-expression (Seheda & Tereschenko, 2020). This positive impact is even stronger among pupils who do not participate voluntarily and have not yet been frequently exposed to creative experiences (Briguglio et al., 2022). In addition to creativity, academic performance (results and aspirations) is also positively influenced by participation in such cultural activities within a school context (Egana-delSol, 2023)[10]. The application of artistic principles in secondary education contributes to the development of pupils' personal qualities and mental skills (thinking, attention, imagination) and lays the foundation for the development of competences and the formation of well-rounded, culturally aware, creative and self-assured personalities (Seheda & Tereschenko, 2020). The use of musical and artistic means of expression has a positive impact on the development of creativity in adolescents, when the appropriate pedagogical methods are employed during arts education. Elements of such a 'appropriate pedagogy' are discussed in more detail below, under the section 'influencing factors'.

Finally, cultural participation also has its place within **higher education**, although arts education is less frequently a fixed part of the curriculum there. One possibility is, for example, to use arts-based methods as an alternative teaching approach (de Arriba et al., 2019). This occurs both within programmes that focus on students' creativity (Kuo & Tien, 2022) and through the use of such methods to enhance general learning (de Arriba et al., 2019). Cognitive development in learning through art involves skills such as creativity, independent learning and complex thinking skills that can be applied in learning environments and situations. One study, in which nursing students took a course on decorative art, illustrates the broad scope of application of creativity acquired through arts education (Baş et al., 2022). The course helped them to develop critical thinking skills and creativity. Creativity is important in nursing for interacting effectively with patients

[10] More information on the impact of cultural participation on individuals' 'learning' can be found in section 3 of this report.

(Luongo, 2004), making sound decisions (Pavill, 2011; Weston & Stoyles, 2010) and intervening in various situations (Zodpey et al., 2018). Integrating creative arts into health education leads to better medical practice (Haidet et al., 2016). Education that stimulates students' critical thinking and creativity helps them to develop the skills required to provide effective and safe care. Furthermore, it enables students to cope better with difficult and unexpected situations and to experience fewer negative consequences from the often high workload (Baş et al., 2022; Kim & Choi, 2014).

Influencing factors

Not only in informal learning contexts, but also within formal educational settings, the **approach to** or **implementation** of cultural participation is essential for creativity. According to research by Cheng and colleagues (2022), arts education with an interdisciplinary approach, based on projects and more hands-on activities where the (learning) objectives are clear to all parties from the outset, encourages pupils to think more divergently and work more creatively compared to arts education where the emphasis is more on imparting basic knowledge, there are fewer opportunities for self-discovery, and space for active engagement is only provided at the end of a programme. Both an **interdisciplinary and an integrated approach** to teaching, incorporating **project-based work** and **clear final objectives**, are potential mechanisms that ensure arts education, more so than a traditional approach that stimulates individuals' creativity. Interdisciplinary projects, which combine different fields of knowledge, offer pupils a variety of problem solving methods, broaden their way of thinking and enable them to break through the limitations of subject-specific knowledge and solve problems creatively. In project-based learning, children learn more through discovery (there is room to fail and try again), which stimulates interest and intrinsic motivation and thus encourages their creativity.

To successfully foster creativity in schools, it is not enough to focus solely on predetermined learning objectives and outcomes. A process-oriented development of creative skills is necessary to successfully facilitate creativity in schools (Munk et al., 2024; Sawyer, 2019). A **flexible and dynamic** system comprising phases of thinking, planning, shaping ideas, imagination and spontaneity contributes to this (Munk et al., 2024). Other characteristics of the learning process that stimulate creativity in pupils include a more pupil-centred approach, active pupil participation, problem-based learning and collaboration (Kalafati et al., 2025).

Furthermore, **teachers** play a central role in developing pupils' creative potential (Cheung & Mok, 2013; Chien & Hui, 2010; Davies, 2010; Hui et al., 2013; Leong, 2010). In order to achieve positive outcomes, it is important that they have confidence in the added value of the used arts education approach and are willing to apply it actively (Hui et al., 2015). A clear methodology can not only support teachers in shaping creative learning practices, but also in fostering dialogue and mutual understanding, developing concrete creative collaborations and strengthening democratic processes within their professional learning community (i.e., relationships between teachers) (Munk et al., 2024). Other characteristics of teachers that stimulate pupils' creativity include the ability to cope with change, a willingness to reflect, a critical mindset, open-mindedness, flexibility, self-control, a thorough knowledge of the classroom context and a supportive attitude (Kalafati et al., 2025).

Finally, certain characteristics of **pupils** are also important for creativity. An interest in learning is a key factor in the development of creativity (Hidi & Renninger, 2006). Not just interest, but also the level of self-regulated, self-directed or independent learning is an important characteristic for maintaining acquired creativity and for transferring or applying creative skills at school (Kuo & Tien, 2022). Other characteristics in pupils that stimulate creativity include intrinsic motivation, personal effort, autonomy, imagination, self-confidence, responsiveness to challenges, a willingness to explore, etc. (Kalafati et al., 2025).

2.3. Inspiration

Finally, **inspiration** is a key element of creativity resulting from cultural participation and **explains** why taking part in cultural activities stimulates creativity (An & Youn, 2018; Ishiguro & Okada, 2020). For everyone, whether amateur or professional artists, viewing art inspires us to create works of art ourselves, a phenomenon also known as the interaction between viewing and creating art (Ishiguro & Okada, 2020). Art education exposes participants to art and can inspire them to create. The creativity that arises from a particular artistic activity is not limited to the discipline in question (painting or drawing, for example), but can also be applied in other artistic fields (music, writing or dance, for example). By adopting a dual focus – both evaluating works of art and reflecting on how these relate to their own individual artistic activities – individuals experience inspiration whilst viewing works of art. Inspiration then acts as a facilitator between viewing art and one's own artistic activity.

Inspiration is a **mediator** that facilitates creative cognition (An & Youn, 2018). Rather than being an autonomous source of creativity, it ensures that motivation is translated into

creative ideas (Oleynick et al., 2014). People who are inspired by, for example, viewing art, are more motivated and generate more creative ideas (Thrash et al., 2010). Inspiration itself, in turn, stems from the ability to appreciate specific cultural practices and forms (An & Youn, 2018). People with a more open attitude towards artistic and cultural activities tend to think more divergently (Feist & Brady, 2004; Furnham & Avison, 1997; McCrae, 1987; McCrae & Costa, 1997; Rawlings et al., 2000), exhibit more creative behaviour and creative interests (Griffin & McDermott, 1998) and experience greater inspiration (Thrash & Elliot, 2003). In summary, therefore, both the evaluative and reflective experience of art (Ishiguro & Okada, 2020), the ability to appreciate art and an open attitude to aesthetic experiences (An & Youn, 2018) are key determinants of inspiration, which in turn stimulates creativity.

Table 3: Summary of included studies on cognitive development and creativity

Author (year)	Research method	Key findings
Gong et al. (2023)	Mixed methods research • Survey • Task data • Interviews	Living in accordance with the cultural value of long-term orientation is positively associated with experiencing pleasure or enjoyment and relief during a creative process.
Sovansky et al. (2016)	Survey research	Both having experience (expertise) and actively creating within the discipline of music have a positive influence on the creativity (divergent thinking) demonstrated in this context.
Ishiguro & Okada (2020)	Literature review	Inspiration is the mechanism that transforms the experience of art into artistic creativity. It involves a dual focus – evaluating works of art and reflecting on one's own artistic activities – which centres on both or exclusively physical and/or psychological aspects of art.
Varl & Herzog (2021)	Quasi-experimental research	The integration of contemporary artistic practices into the primary school curriculum has a positive effect on pupils' artistic creativity of pupils.
An & Youn (2018)	3 experimental studies, survey data and assignments	Appreciating art provides inspiration, which in turn enhances performance in creative tasks. This effect of art on creativity through inspiration applies in professional work environments as well.

Kim (2015)	Interviews & observation	Community-oriented art education uses creativity (creative thinking) to foster resilience as a response to school violence amongst primary school pupils.
Hui et al. (2015)	Quasi-experimental research using test and survey data	Art education delivered jointly by professional artists and professional teachers stimulates the verbal and figurative creativity of pre-school children.
Kalafati et al. (2025)	Action research • Observation • Interviews	Education for sustainable development through visual arts stimulates critical thinking in young children and gradually transforms this into creative solutions to a problem. Both the characteristics of the pupils and teachers themselves, and those of the learning process (the use of art) stimulate and facilitate this outcome.
Cheng et al. (2022)	Quasi-experimental survey research (+ product evaluation)	The creativity of primary school pupils who make a musical instrument as part of a project-based STEAM programme (*Science, Technology, Engineering, Arts, and Mathematics*) improves more than that of pupils who are taught the same curriculum content in a traditional way. Creativity is best measured using various methods.
Sowden et al. (2015)	Quasi-experimental research (2 experiments)	Participation in short cultural improvisation activities has benefits for divergent thinking and creativity in children (aged 8-11).
Munk et al. (2024)	Action research • Observation • Focus groups	Developing a theatre-based methodology in secondary education encourages creative practices, both during lessons and in the way teachers operate within their professional community at school.
Briguglio et al. (2022)	Quasi-experimental survey research	Participation in the *Kreativ* educational programme has a positive impact on the creativity of secondary school pupils (aged 11-16). The effect is greater in the absence of self-selection and when there is little exposure to other creative activities.
Egana-delSol (2023)	Quasi-experimental research using survey, task and administrative data	Participation in art workshops leads to greater creativity, better academic performance and more frequent participation in other cultural activities.

Seheda & Tereschenko (2020)	Mixed methods research • Content analysis • Survey • Observation • Tests, interviews & evaluations • Experiment	When attention is paid to the characteristics of creativity and the pedagogical approach, art lessons at school have a positive impact on the creative development of adolescents.
de Arriba et al. (2019)	Mixed methods research • Focus group • Survey • Assignments	An art assignment within the political economy programme provided students with a holistic and transformative learning experience with positive cognitive and affective benefits.
Kuo & Tien (2022)	Longitudinal experimental research	The use of art-based methods in creativity training enhances the creative abilities of business administration students. Their level of self-regulated and independent learning is a key determinant of the transfer of creativity from school to a work environment.
Baş et al. (2022)	Quasi-experimental survey research	A decorative arts course within the nursing programme has a positive impact on the creativity and critical thinking skills of students.
Hoffmann et al. (2021)	Quasi-experimental longitudinal survey research	Participation in an art-based and emotion-based course leads to an improvement in the creative skills 'generating ideas' (originality and fluency) and 'identifying problems' (fluency), as well as an increase in creative behaviour and emotional skills.
Gong et al. (2020)	Experimental research using survey and test data	Regular visits to a children's museum over the course of a year have a positive impact on the creativity (originality and fluency) of pre-school children (aged 4 years old).
Zheng et al. (2021)	Mixed-methods quasi-experimental research • Survey • Interviews	The use of an interest-based creative activity for teaching scientific knowledge in a science museum is effective in improving the learning outcomes and creativity of pupils.

3. Learning

In addition to creativity, cultural participation can also promote broader learning processes in individuals. We divide this third and final cognitive value of culture into the use of cultural participation as a **learning tool** on the one hand, and the learning impact that cultural participation has on the other. In the case of cultural participation as a learning tool, culture is used within a specific context (education, for example) to teach individuals cultural or other knowledge (see section 3.1). The **learning impact** of cultural participation, on the other hand, relates more to how cultural participation in one context (such as pursuing a creative hobby in one's spare time) influences learning in another context (such as academic performance) (see section 3.2).

3.1. Learning tool

The majority of the included studies that use culture as a learning tool confirm the added value of cultural experiences and cultural participation for knowledge acquisition and broader learning processes. Two studies are exceptions to this. In the study by Freilich and Shechtman (2010), adding art therapy to the usual learning support pupils receive, did not lead to an improvement in their academic performance. Art therapy did, however, have an effect on the adaptive behaviour of pupils with a learning disability. The second exception is the study by Mages (2018), in which the progress made by pre-school children (including in terms of language proficiency) could not be attributed to the integration of educational drama and theatre activities into pre-school education[11]. Both pre-school children who took part in this cultural programme and those who did not showed improvements in their language skills, perspective-taking and imagination.

All other studies do, however, find a positive link between the use of cultural participation as a learning tool and individuals' knowledge of the topics covered during such activities or programmes. In only one of the studies cultural participation is used to **learn about culture** itself. In this case, when pre-school children were given multiple opportunities to visit exhibitions in a museum, they gained an understanding of this context in relation to current practices (i.e., the roles of visitor and exhibitor), understanding the purpose of museums and

[11] Further information on the social skills of children with learning difficulties can be found in the report on the social value of culture (Goemaere et al., 2025b).

being able to appreciate art (i.e., telling stories, studying works closely, making connections with prior knowledge, offering aesthetic comments, etc.) (Clarkin-Phillips et al., 2013).

Learning about **other subjects** – such as acquiring knowledge outside the cultural sphere (for example, about science or history) – takes place, similar to the development of creativity, in both formal and informal learning environments, as the studies included show. **Informal learning environments** in this context consistently include museums that seek to impart knowledge on a particular subject to their visitors through an exhibition and various works of art or other cultural objects (Ermatita et al., 2023; Karamanov et al., 2023). In the research by Karamanov and colleagues (2023), for example, teachers from secondary and higher education give a positive assessment of museums' educational programmes as a means of engaging with their pupils and students. Among other things, access to authentic objects and this unique experience of enhancing learning are difficult to replicate in the same way within a school context. Moreover, this is not only possible through physical presence. Museums can also use virtual media (such as an app featuring a tour guide, educational information and recommendations based on *machine learning,* for example) to enable individuals to explore their exhibitions and thereby enhance their learning outcomes and motivation (Ermatita et al., 2023; Puspasari et al., 2021).

In **formal learning and teaching environments,** cultural practices at school are used to convey knowledge about a particular subject to pupils within the context of a specific subject (Burns et al., 2021; Hardiman et al., 2019; Kisida et al., 2020). One example is organising lessons in which primary school pupils use visual arts to improve their understanding of and knowledge about dementia (Burns et al., 2021). Art programmes offer an ideal way of conveying information in an accessible, accepted, engaging and memorable manner (Clift, 2012; Noble et al., 2015; Willimans & Noble, 2008). In this example, pupils were asked to adapt their artwork as if it had been created by someone with dementia after attending an informative lesson (Burns et al., 2021). Through visual arts, children are able to visualise their thoughts whilst reflecting on the world around them (Vygotsky & Cole, 1978). It is not just knowledge about specific subjects that is transferred, but cultural practices could be used for various aspects of education. Furthermore, pupils in programmes focusing on the arts perform better than those in programmes focusing on academic content (Scripp & Paradis, 2014). Another possibility within formal learning environments is that, through cultural participation, pupils practise certain skills which they in turn apply in a different domain or context (Pavill, 2011). In a nursing degree programme, for example, cultural practices – such as expressing an experience through visual art – are used as a learning tool to understand

patients' holistic needs and to resolve challenges in caring for people (Mareno, 2006; Nezeau, 1994; Pavill, 2011; Schwartz et al., 2009; Smith et al., 2004).

3.1.1. Organisational approach

Furthermore, the way in which cultural participation is organised as a learning tool is important. For example, the role of adults in facilitating supportive interactions and asking appropriate open-ended questions, which encourage reflection and thus stimulate thought processes, is necessary to ensure that children learn effectively (Haas, 1997). According to Gaufberg and colleagues (2023), it is important – even for adults – to hold a reflective discussion following the cultural activity or experience (the museum visit), so that the knowledge gained is effectively transferred to other domains or contexts. Creative thinking and the cognitive nature of educational programmes in museums form the core upon which these must be based (Karamanov et al., 2023). In addition, an interdisciplinary content (i.e. incorporating different fields of knowledge) and taking into account the age and other individual characteristics of visitors are important. Collaborations between educational institutions, museums and research institutions are an effective way of organising such programmes in museums. Teachers contribute their pedagogical expertise, museum staff their subject-specific and audience-oriented knowledge, and researchers their methodological expertise. Within formal educational settings too, partnerships between the education sector (schools) and the cultural sector (cultural organisations and professionals) are an effective way of, for example, integrating art into curricula (Kisida et al., 2020). Such collaborations complement the educational provision with experiences and opportunities that schools find difficult to offer on their own (Bowen & Kisida, 2019). Specifically with regard to the educational programmes or interventions themselves, learning methods in which participants actively engage their bodies and movement can, for example, promote the processing and retention of knowledge (Anderson, 2018; Hardiman et al., 2014).

3.1.2. Social inequalities

The use of cultural participation as a learning tool in an educational context is most effective for pupils who struggle within conventional school models (Peppler et al., 2014). Some of the studies included in this report highlight the potential of integrating the arts into education to reduce performance gaps between pupils with lower and higher academic achievement and between pupils from different social or ethno-cultural backgrounds (Hardiman et al., 2019; Kisida et al., 2020).

Arts-based interventions have a greater impact on the academic performance of **lower achieving pupils** than on that of average or high-achieving pupils (Scripps & Paradis, 2014). A concrete example of this are the reading levels of pupils (Kisida et al., 2020). In the study by Kisida and colleagues (2020), pupils who learnt about science through art-based methods scored higher on knowledge-based questions on the subject than pupils who were taught in a conventional manner. For pupils with a basic reading level or higher, the teaching method made no difference. Pupils with lower reading levels benefit most from this pedagogical approach, which makes a strong case for integrating the arts into lessons, as it helps pupils who would otherwise struggle. The integration of the arts into education and learning through the arts offers diverse, alternative forms of knowledge processing and expression, enabling pupils with reading or language difficulties to make better use of their existing knowledge, connect new information and retain it. In this way, they are given additional opportunities to demonstrate their mastery of the subject matter, which helps to reduce performance gaps.

Furthermore, some studies suggest that arts education and the integration of the arts can have relatively strong effects on pupils from **ethnic and cultural minority groups** and pupils from families with a **lower socio-economic status** (Kisida et al., 2014; 2020; Rabkin & Hedberg, 2011). One possible explanation is that, due to financial and other barriers, these pupils generally have less access to arts and cultural experiences outside the school context. When schools do offer such experiences, they can partially compensate for existing disparities in cultural opportunities. The observed effects should therefore not be attributed to pupils' minority status per se, but rather to differences in access, prior experiences and educational opportunities.

Table 4: summary of included studies on culture as a learning tool

Author (year)	Research method	Key findings
Freilich & Shechtman (2010)	Quasi-experimental survey research	Adding art therapy to academic support (tutoring) for children (aged 7–15) with a learning disability has a positive impact on their ability to adapt, but has no impact on their academic performance.

Mages (2018)	Quasi-experimental mixed-methods research • Survey • Observation • Interviews	The inclusion of drama and theatre programmes in pre-school education led to improvements in pre-school children's language skills, perspective-taking and imagination. These skills also improved among pre-school children following the traditional curriculum (without theatre).
Clarkin-Phillips et al. (2013)	Case study • Narrative review • Observation • Interviews	Preschoolers (aged 3–4) gain an understanding of a museum's objectives and standard practices when they are given the opportunity to visit an exhibition on several occasions and are part of a culture in which museum visits are pre-school education.
Karamanov et al. (2023)	Survey research	Both teachers in secondary and higher education and museum staff are interested in and support the introduction of educational programmes in museums for the dissemination of scientific knowledge.
Ermatita et al. (2023)	Case study, quasi-experimental survey research	An application that uses machine learning to offer a virtual museum improves visitors' cognitive performance in relation to learning about the culture on display.
Gaufberg et al. (2023)	Descriptive research	Museum activities designed to maximise the knowledge transfer between museums and clinical settings, should provide an opportunity for reflective dialogue.
Burns et al. (2021)	Case study, quasi-experimental mixed methods research • Survey • Content analysis	Pupils' (aged 8–10) understanding and knowledge of dementia increased through participation in a three-phase teaching programme that used visual arts as a form of expression.

Hardiman et al. (2019)	Experimental research	Integrating art into the teaching of scientific subject matter is as effective, or even more effective, than traditional science teaching in terms of strengthening pupils' long-term memory of scientific knowledge. Pupils with lower levels of reading performances benefit most from this pedagogical method.
Kisida et al. (2020)	Experimental survey research	Watching an educationally designed theatre programme on history leads to an increase in primary school pupils' knowledge of history, historical empathy, interest in the performing arts and learning about history.
Pavill (2011)	Case study, evaluation study	Incorporating a creative project into the nursing degree programme promotes self-awareness (including in relation to creativity) and holistic thinking in patient care and students' empathy.

3.2. Impact on learning

Studies on the learning impact of culture examine the relationship between cultural capital and education-related outcomes, such as school performance, academic success and grades. Cultural capital refers to culturally valued knowledge, skills, preferences, attitudes and behaviours that are recognised as legitimate within certain social and institutional contexts and can therefore yield social advantages (Bourdieu, 1986; Lamont & Lareau, 1988). Bourdieu (1986) distinguishes between three forms of cultural capital. Institutionalised cultural capital comprises formally recognised qualifications such as diplomas and professional certificates. Objectified cultural capital refers to cultural goods such as books, art and musical instruments. Embodied cultural capital consists of internalised knowledge, preferences, skills, dispositions and manners. Cultural participation cannot simply be equated with embodied cultural capital, but it can be regarded as a cultural practice in which this capital is expressed and further developed.

Given this report's focus on cultural participation, only studies were included in which participation in cultural activities by pupils and/or their parent(s), and/or cultural preferences (enjoyment of classical music, an interest in reading or children encouraging

people to take part in leisure activities, for example) were examined as indicators of cultural capital. Studies that considered only objectified or institutionalised cultural capital were excluded. The included studies focus primarily on cultural participation and examine this, amongst other things, on the basis of visits to museums or art galleries, attending theatre, musical, opera, ballet or music performances, participation in art classes and visits to the cinema.

With regard to cultural participation, the majority of the included studies focus on the **positive link** between cultural participation among **pupils and students** and their educational outcomes (Breinholt & Jæger, 2020; Byun et al., 2012; Gaddis, 2013; Jæger, 2011; Jin et al., 2022; Johnson & Reed, 2023; Ma & Wu, 2020; Mikus et al., 2020; Planson, 2023; Tan, 2020; Tramonte & Willms, 2010; Xie & He, 2023; Xu & Hampden-Thompson, 2012; Yu et al., 2022). Each of these studies indicates that there is a positive correlation between cultural capital on the one hand and various educational outcomes on the other. Individuals who participate more in cultural activities are therefore more likely to succeed at school.

Conversely, it is not only pupils' or students' own participation in cultural activities that has a positive impact on their academic performance; their **parents'** participation in cultural activities is also a determining factor in how pupils perform at school. Three of the studies included focus exclusively on parents' participation in cultural activities and do not take into account children's participation in such activities (Cheng & Kaplowitz, 2016; Chiu et al., 2015; Leopold & Shavit, 2013). Parents' cultural activities encourage children to learn and explore knowledge (De Graaf et al., 2000; Gottfried, 1990; Gottfried et al., 1998). For instance, greater cultural capital within the family in which a child grows up leads, for example, to greater motivation to read and, consequently, increased reading behaviour among children (Chiu et al., 2015). Parents' cultural capital and the associated benefits are therefore passed on to their children, and this is evident, amongst other things, in the positive impact on their educational outcomes (Cheng & Kaplowitz, 2016).

All other studies include both the children's own cultural participation and that of their parents as indicators of cultural capital (Dumais & Ward, 2010; Jæger & Mollegaard, 2017; Jheng et al., 2023). They present similar findings regarding the positive relationship between cultural capital (cultural participation) and learning (educational attainment). However, weak or negative associations are sometimes found when a specific learning outcome is examined. In the study by Johnson and Reed (2023), for example, very frequent participation in cultural activities is negatively associated with students' information literacy (this includes, amongst other things, evaluating and locating sources). This may be because these

activities are only loosely linked to academic content and working with information sources. Visiting the library, on the other hand, does have a positive impact on their information literacy. In contrast, Tan (2020) found that cultural participation, despite the absence of a direct connection to academic content, is an important factor in pupils' scientific literacy. Cultural capital – and specifically cultural participation – therefore has an impact on learning and academic performance, but the presence or strength of this link is partly determined by the specific outcome being focused on.

In general, all the studies included in this report confirm that cultural capital – which is **passed on** from parents to children and fostered through participation in various cultural activities – improves individuals' academic performance (Kaufman & Gabler, 2004; Kisida et al., 2014; Sullivan, 2007). This applies to pupils in pre-school (Breinholt & Jæger, 2020; Jheng et al., 2023), primary (Breinholt & Jæger, 2020; Chiu et al., 2015; Gaddis, 2013; Jæger, 2011; Jheng et al., 2023; Leopold & Shavit, 2013; Mikus et al., 2020) and secondary education (Byun et al., 2012; Cheng & Kaplowitz, 2016; Gaddis, 2013; Jæger, 2011; Jæger & Mollegaard, 2017; Jheng et al., 2023; Jin et al., 2022; Leopold & Shavit, 2013; Ma & Wu, 2020; Planson, 2023; Tan, 2020; Tramonte & Willms, 2010; Xie & He, 2023; Xu & Hampden-Thompson, 2012; Yu et al., 2022) as well as for students in (and/or their access to) higher education (Cheng & Kaplowitz, 2016; Dumais & Ward, 2010; Johnson & Reed, 2023).

3.2.1. Social inequalities

The positive correlation between cultural participation and educational outcomes is also characterised by significant social inequalities. Generally speaking, individuals with a higher **socio-economic status** also possess more cultural capital (Bourdieu, 1977; 1984; Bourdieu & Passeron, 1990). Individuals with greater cultural capital are more likely to come from families that also possess other socio-economic resources, which in turn have a positive effect on their educational success (Jæger, 2009; Roscigno & Ainsworth-Darnell, 1999; Sullivan, 2001). Bourdieu and Passeron described this as **cultural reproduction** (Bourdieu, 1977, 1984; Bourdieu & Passeron, 1990). As cultural capital is predominantly found in environments with high socio-economic status, the benefits derived from it are also greater for individuals from these backgrounds. Those with a high(er) socio economic status therefore benefit most from cultural capital (or certainly more so than those with a low(er) socio-economic status). Several of the studies included confirm this notion of cultural reproduction (Jæger, 2011; Jæger & Mollegaard, 2017; Xu & Hampden-Thompson, 2012). Jæger and Mollegaard (2017) found no effect of cultural participation on the academic success

of children with parents who had a low level of education (and therefore a low(er) socio-economic status). In general, the effect of cultural participation is stronger in environments with a high socio economic status compared with those with a low socio-economic status (Jæger, 2011; Xu & Hampden-Thompson, 2012). In this way, the link between a person's background and certain outcomes in their life (academic performance in this case) is reinforced by cultural capital. Cultural capital is therefore an important determinant of academic success and explains differences between social groups in this regard.

The opposite idea– cultural capital yielding greater benefits for individuals with low socio-economic status –, known as **cultural mobility**, was also found (Jæger, 2011). Unlike traditional cultural participation, participation in extracurricular cultural activities (such as dance or drama lessons) has a stronger impact on academic performance (reading and math tests) in settings with a relatively low or average socio economic status. However, cultural reproduction and cultural mobility can coexist (depending on the outcome under investigation) (Jæger, 2011; Xu & Hampden Thompson, 2012).

In addition to socio-economic inequalities, there are also **ethno-cultural differences** in the extent to which cultural participation is associated with educational outcomes. Several studies suggest that cultural capital yields fewer benefits for ethno-cultural minorities than for ethnic-cultural majorities (Driessen, 2001; Roscigno & Ainsworth-Darnell, 1999). In Planson's (2023) study, for example, participation in music has a positive impact on pupils' academic results (grades). However, for pupils from a different ethno-cultural background (in this specific study, pupils of Haitian origin born in the French overseas departments), participation in music is associated with lower (or a decline in) their grades. One possible explanation is that not all cultural preferences, practices and musical genres are valued to the same extent or recognised as legitimate within the education system and wider society. According to Planson, this points to the existence of 'racial cultural capital', whereby different characteristics are valued in relation to one's ethno-cultural position. He argues that when certain resources function as cultural capital to a greater extent for the majority population than for non-white population groups, this is an indication that cultural capital is racialised. The fact that cultural practices do not translate into certain benefits to the same extent for different ethno-cultural groups is a mechanism that perpetuates ethno-cultural inequality.

3.2.2. How does cultural participation impact learning?

Two mechanisms – which in academic literature are frequently linked to the concept of cultural reproduction – are cited in several of the included studies as possible explanations for how cultural capital or cultural participation specifically influences educational outcomes. The first mechanism is the **symbolic function** of cultural capital. This implies that cultural capital creates a **bias** amongst teachers, in the sense that they have a distorted view of pupils' academic abilities (Bourdieu, 1974; Bourdieu & Passeron, 1990). Teachers (mis)interpret pupils' cultural capital as academic genius, which leads, for example, to favouritism and preferential treatment, and ultimately results in academic success (DiMaggio, 1982; Jæger & Breen, 2016; Kalmijn & Kraaykamp, 1996; Roscigno & Ainsworth-Darnell, 1999; Wildhagen, 2009). Cultural capital therefore does not reflect pupils' actual academic ability, but requires a teacher to act as a catalyst to transform it into success. This process is thought to apply primarily to cultural participation in the fine arts, rather than to more everyday cultural practices (such as reading, for example) (Mikus et al., 2020).

Furthermore, in their research, Jæger and Mollegaard (2017) found that cultural capital has a positive impact on pupils' grades only in the case of one-off assessments by teachers (such as a written or oral exam), whilst this is not the case for grades awarded throughout the school year. Cultural capital appears to give teachers a distorted picture of pupils' academic abilities, but only when they have brief exposure to their cultural capital (as is the case with an exam). Teachers who are in contact with pupils throughout the school year are more often able to 'see through' their cultural capital. A new assessor who has only a brief contact with the pupil (particularly during an oral examination) and who has no other prior knowledge of the child is more easily influenced by the pupil's cultural capital. Furthermore, according to Leopold and Shavit (2013), this misinterpretation of cultural capital by teachers is partly determined by the presence or absence of a migrant background among pupils. Their research showed that the marks of pupils without a migrant background are positively correlated with their cultural capital, whilst the correlation for pupils with a migrant background is much weaker or even non-existent. Teachers therefore also play a role in further perpetuating the racial inequalities already discussed with regard to the impact of cultural capital at school (see section 3.2.1).

The second mechanism is the **skill-enhancing function** of cultural capital. This means that cultural capital contributes directly to the development of skills (such as analytical competence and creativity) and thus leads to success at school (Crook, 1997; De Graaf et al., 2000; Kaufmann & Gabler, 2004; Kingston, 2001; Kisida et al., 2014; Lareau, 2011; Sullivan,

2001; 2007). Some of the studies included cite these skills as an explanation for their findings (Breinholt & Jæger, 2010; Jæger & Mollegaard, 2017). According to them, the link between cultural capital and academic success is not directly related to how teachers perceive and assess pupils, but rather to the skills pupils possess and how different school environments enable pupils to translate these skills into outcomes such as qualifications (Calarco, 2011; Lareau, 2003). Some of the studies included identified both mechanisms as relevant (Mikus et al., 2020; Xie & He, 2023). Both the symbolic and the skill-enhancing functions of cultural capital can therefore contribute to explaining educational outcomes. The two mechanisms need not be mutually exclusive.

In addition to these two mechanisms, other possible explanations for the impact of cultural participation exist. The link between cultural participation and academic achievement is (partly) mediated by **pupils' expectations** regarding **self-study** (Yu et al., 2022), their **self-perception** regarding their belief that they can succeed at school, and their belief in education and its value for their future success in life (Gaddis, 2013). With regard to the impact that **parents'** cultural participation has on their child(ren)'s learning, it is essential that they actively **encourage** their children in the area of culture (Magsamen, 2011). Children often have their first cultural experience(s) at home, and these form a foundation to improve their learning process (later) at school. Given that subjects such as art are becoming increasingly rare in schools, the role of parents is all the more crucial. Parents are often unaware, or only vaguely aware, of the potential impact of cultural participation on their children's cognition, social-emotional development, attention, executive functions, memory development, etc. Enabling their children to participate in cultural activities is often a poorly considered choice (for example, they let them play a musical instrument because they did this themselves as children). Possessing cultural capital is therefore not sufficient to bring about this effect; parents must **motivate** their children to develop a certain habit in this regard (Pintrich, 2003; Pintrich et al., 1993; Wigfield et al., 2006). The importance and impact of culture during children's upbringing must therefore not only be made clear within educational contexts themselves, but parents must also receive this message in an accessible way (Magsamen, 2011). Parents' understanding of the benefits of cultural participation will have a positive influence on the way in which they support and guide their children's artistic choices.

3.2.3. Different impacts in different contexts

Furthermore, it is not only important who participates in cultural activities in terms of the impact on their learning, but also the **social context** in which this takes place. Tan's (2020)

research shows that cultural capital is more strongly correlated with subject specific literacy in more unequal and economically more developed societies. In the latter, pupils' home background has a greater impact, as most schools in economically more developed societies have sufficient resources. Furthermore, the value or importance that societies attach to education also determines the impact of cultural capital within the educational context. In societies that place a high value on education, cultural participation is a less determining factor in pupils' educational outcomes (Tan, 2020). Societies with a Confucian tradition are often cited as examples in this context. This term refers to societies in which Confucianism has historically exerted a significant influence on norms relating to education, dedication, respect for parents and teachers, and academic success (for example, Asian countries such as China, Singapore and Japan). In such societies, weaker links are found between parents' socio-economic status and pupils' academic performance (Bond, 1996; Broaded, 1997; Chao, 1996; Smith, 1981; Stevenson & Lee, 1996; Wu, 1996; Yu, 1996), and cultural capital and cultural participation show a weaker link to academic achievement than in comparable societies without a Confucian tradition (Jheng et al., 2023). This interpretation remains cautious, however, as institutional, economic, political and historical differences may also play a role.

The **educational context** also influences the extent to which cultural capital is linked to pupils' academic performance. In this regard, there are differences between schools and between education systems. With regard to the former, there are *differences between schools* in the extent to which cultural participation is important or decisive for pupils' subject-specific literacy or knowledge (for example, language, math and science). According to Tan (2020), cultural participation is more strongly associated with educational outcomes in lower-performing schools and in schools that score better on certain quality indicators (the amount of teaching resources and the number of qualified teachers for example). In high-performing schools, by contrast, this association is weaker.

As regards the *differences between education systems*, there are three relevant dimensions. The degree of centralisation constitutes the first dimension. In centralised education systems, there is a weaker link between cultural participation and pupils' literacy or knowledge of various subjects (Jheng et al., 2023; Tan, 2020). In decentralised education systems[12], where

[12] Examples of countries with more decentralised or autonomous education systems include the Netherlands, New Zealand, Australia, Estonia, Iceland and the Czech Republic.

there is less government intervention, this link is stronger and cultural participation plays a more significant role in determining educational outcomes.

A second dimension concerns the degree of standardisation versus differentiation or stratification: cultural participation is less important in standardised education systems[13] and more important in differentiated education systems[14] in determining educational outcomes (Tan, 2020).

The third and final dimension concerns the level of competition and focus on achievement within the education system. A number of studies indicate that, for certain countries (South Korea and China for example), there are no significant – or even negative – correlations between pupils' cultural participation and their academic performance (Byun et al., 2012; Ma & Wu, 2020; Xie & He, 2023). They attribute this, amongst other things, to institutional characteristics, such as the level of competition within the education system and the extent to which the system is exam-oriented. One of the key features of such an education system is that standardised tests determine the course of pupils' educational careers (Hu, 2017; Kim & Byun, 2006; Zhu, 2018). Teachers' assessments are therefore of less importance in this context. Furthermore, the standardised curricula in these education systems often contain little to no (highbrow) culture, and hardly any cultural activities are organised at school, which prevents pupils from expressing their cultural capital which limits its signalling function (see section 3.2.2) (Hu, 2017; Wu et al., 2017; Xie & He, 2023). Furthermore, there is a strong sense of competition in the field of education – which prompts parents to enrol their children in (private) tuition more frequently – and fierce competition amongst pupils themselves, causing them to experience high pressure to perform (Baker & LeTendre, 2005; Byun et al., 2012; Hannum et al., 2019; Xie & He, 2023). Consequently, in such education systems, cultural activities and lessons are viewed as something that comes at the expense of study time and negatively affects pupils' academic performance.

[13] Examples of countries with more standardised or centralised education systems include Turkey, Greece, France and Luxembourg.

[14] Examples of countries with more differentiated or stratified education systems include Germany, Austria, Belgium, Switzerland and Slovakia.

Table 5: Summary of included studies on the impact of culture on learning

Author (year)	Research method	Key findings
Breinholt & Jæger (2020)	Longitudinal survey research	Cultural capital (an interest in reading) has an impact on children's academic performance because of the skills it equips them with. This is true in educational settings with both high and low socio-economic status.
Byun et al. (2012)	Cross-sectional survey research	A family's socio-economic status has a positive effect on the cultural capital of parents and children. In Korea, parents' (objectified) cultural capital has a positive impact on their children's academic performance, whilst children's (embodied) cultural capital (cultural participation) has a negative.
Gaddis (2013)	Longitudinal survey research (interviews)	The positive effect of cultural capital on academic performance among disadvantaged young people (low socio-economic status) is mediated by their habitus (young people's perceptions of their chances of success at school and of the importance of education for success in their lives).
Jæger (2011)	Longitudinal survey research	Cultural capital has a positive effect on academic success, albeit smaller than is generally reported in research. The strength of this effect depends on which aspect of cultural capital is considered and in which type of environment (high or low socio-economic status) is present.
Jin et al. (2022)	Cross-sectional survey research	Institutionalised and embodied cultural capital play an important role in the educational success of children across generations, and these effects vary by region and gender. No such effect exists for objectified cultural capital.
Johnson & Reed (2023)	Cross-sectional survey research	Students' cultural capital (literature-based) or their parents' (institutionalised) cultural capital is positively associated with these students' information literacy. There is no such

		association between cultural participation or parental involvement and these information skills.
Ma & Wu (2020)	Cross-sectional survey research	Objectified cultural capital is an important mechanism that explains the impact of migration background on pupils' academic performance in secondary education.
Mikus et al. (2020)	Cross-sectional survey research	Children convert their cultural capital into better academic performance through both symbolic and skill enhancing functions. The latter occurs primarily through active cultural participation, the first one more through receptive cultural participation.
Planson (2023)	Cross-sectional survey research	Cultural capital brings advantages (higher marks) in education, but this association has a racial component. Various cultural practices are less beneficial for pupils from ethnic minority groups than for pupils from the ethnic majority group.
Tan (2020)	Literature review	The links between cultural capital and learning outcomes vary depending on the type of cultural capital variables, the type of learning outcomes (subject) and the educational and social context.
Tramonte & Willms (2010)	Cross-sectional survey research	Relational cultural capital (highbrow cultural activities and practices) has a stronger effect than static cultural capital (children's engagement in communication and cultural interactions) on the educational outcomes of pupils in secondary education.
Xie & He (2023)	Cross-sectional survey research	Objectified cultural capital (resources) has, also in China, a positive influence on the academic achievement of adolescents. Embodied cultural capital (cultural participation) has a negative effect on this.
Xu & Hampden-	Cross-sectional survey research	Across different welfare regimes, cultural capital influences the educational attainment of pupils in secondary education. Cultural reproduction (cultural capital reinforces

Thompson (2012)		educational inequalities) is particularly relevant in liberal regimes.
Yu et al. (2022)	Cross-sectional survey research	Cultural capital within the family has a positive influence on the academic performance of secondary school pupils. For objectified and embodied cultural capital, this relationship is mediated by pupils' attitudes towards learning and their expectations regarding self-study.
Chiu et al. (2015)	Cross-sectional survey research	Parents' cultural capital influences pupils' reading behaviour (primary education) via its positive influence on reading motivation.
Leopold & Shavit (2013)	Cross-sectional survey research	Pupils from migrant backgrounds derive little or no benefit from their parents' cultural capital in terms of teachers' assessments, whereas this is the case for pupils without a migrant background.
Magsamen (2011)	Descriptive study	Parents are often still not sufficiently informed about the role of the arts in their children's learning processes. Efforts must be made to communicate the findings of research on this subject to parents.
Cheng & Kaplowitz (2016)	Cross-sectional survey research	Parents' cultural capital and economic status influence their children's cultural capital and academic performance. This is not only the case in Western societies, but also in East Asian societies such as Taiwan.
Dumais & Ward (2010)	Quantitative research • Longitudinal survey • Administrative data	Cultural capital primarily plays a role in access to higher education, but not in academic success such as graduation or academic performance. First-generation students face a barrier to entry.

Jæger & Mollegaard (2017)	Quantitative research • Survey • Administrative data	Cultural capital has a positive effect on the academic achievement of secondary school pupils whose parents are highly educated. Bias among teachers (rewarding cultural capital) plays only a minor role.
Jheng et al. (2023)	Meta-analysis	There is a positive correlation between cultural capital and pupils' reading performance. Embodied cultural capital (reading attitudes and behaviour) has the greatest impact on this.

4. Conclusion

This report is the result of an extensive systematic literature review on the cognitive value of culture. Three interrelated forms of cognitive value were identified: the cognitive functioning of individuals, their cognitive development or creativity, and their learning processes. In general, the literature suggests that both active and receptive cultural participation may be positively associated with these outcomes. However, the strength of the empirical evidence and the circumstances in which the effects occur vary depending on the target group, the cultural activity, the context and the outcome under investigation.

Regarding **cognitive functioning**, most studies found positive associations with, amongst other things, memory, cognitive flexibility, executive functions, language skills and visuospatial cognition. The literature focuses heavily on older people and on people with a cognitive condition such as mild cognitive impairment or dementia. Participation in organised cultural interventions, art therapy and cultural engagement in everyday life all appear to offer opportunities to support cognitive functions or slow down cognitive decline. These findings point to the potential of cultural participation as a complement to other forms of cognitive, social or physical activation. At the same time, not all studies allow for causal conclusions. It often remains difficult to rule out the possibility that people with better cognitive functioning or a greater interest in cognitively stimulating activities also participate more frequently in cultural activities.

The results are also predominantly positive in terms of **cognitive development, in the form of creativity**. First, cultural participation can promote artistic creativity within the same or a

related cultural domain. In addition, it can contribute to more cross-domain and non-artistic forms of creativity, such as divergent thinking, problem-solving skills and the generation of original ideas in educational or professional contexts. The effects examined are therefore not necessarily limited to the artistic domain. Receptive participation, such as viewing and discussing art, can also stimulate creative activity through inspiration and reflection. Active creation, however, appears to offer more opportunities to practise various creative and cognitive processes simultaneously. At the same time, the findings make it clear that cultural participation does not automatically lead to cognitive or creative benefits. The way in which activities are designed is at least as important as participation itself. Interactive, participatory and process-oriented activities in particular – which allow scope for personal interests, experimentation, free play, reflection and collaboration – appear to be particularly promising. Expert guidance also plays an important role. In educational contexts, factors such as teachers' commitment and competences, collaboration with cultural professionals, an interdisciplinary approach and the active participation of pupils are decisive for the outcomes.

A third form of cognitive value relates to **learning**. On the one hand, cultural participation can be used in a targeted manner as a learning tool. Arts-based teaching methods can help participants process, retain and interpret new information, and apply it in other contexts. On the other hand, the literature on cultural capital shows that cultural participation by pupils and their parents is generally positively correlated with educational outcomes. However, this correlation is not equally strong for all forms of participation, learning outcomes and social contexts. The social distribution of this cognitive value deserves particular attention in this regard. The integration of culture into learning environments can offer pupils who do not thrive as well within highly language-based or conventional forms of education alternative ways to acquire and demonstrate knowledge. In this sense, culture can contribute to reducing performance gaps. At the same time, cultural participation is unevenly distributed, and not all cultural knowledge, preferences and practices are recognised and valued to the same extent by educational institutions. Thus, cultural capital can both support social mobility and reproduce existing socio economic and ethno-cultural inequalities. It is therefore not enough simply to make cultural offer available; its accessibility, cultural recognisability and institutional valuation are important.

The literature suggests **various, often interrelated mechanisms** that may explain the cognitive value of culture. Cultural activities typically combine cognitive, sensory, motor, emotional and social stimulation. They can encourage participants to engage in attention,

memory, planning, interpretation, imagination, problem-solving and reflection. In addition, enjoyment, inspiration, intrinsic motivation and social interaction can enhance engagement. It is exact this multimodal nature that appears to be a key distinguishing feature of cultural participation: it does not activate a single, isolated skill, but sets various processes in motion simultaneously.

However, when interpreting the results, it is important to bear in mind certain **limitations** of the available literature. Although this report defines cultural participation broadly, the included studies often restrict it to participation in the arts. This is not a deliberate choice on the part of the research, but a reflection of the available empirical academic research: there is far more research on the effects of participation in the arts than on other forms of cultural participation. Furthermore, the activities, target groups and measurement tools examined vary widely. Many studies are observational or use small and selective samples, meaning that self-selection and other alternative explanations cannot always be ruled out. Additionally, there is still insufficient knowledge regarding the duration of the effects, the optimal frequency and intensity of participation, and the extent to which results are transferable across cultural domains and social contexts. More longitudinal and experimental research, focusing on diverse population groups and cultural practices, remains necessary.

In terms of policy and practice, this implies that *we must not only ask whether cultural participation has cognitive value, but above all for whom, under what circumstances, through what mechanisms and with what outcomes*. Organisations wishing to achieve cognitive effects must therefore explicitly state which mechanism their initiative aims to activate, what preconditions are required for this, and how both the process and the outcomes can be monitored. Such a *Theory of Change* makes it possible to distinguish between an initiative that has no effect, despite successful implementation, and one in which the assumed mechanism did not come into play, or did so only to an insufficient extent.

5. Appendix

Table 6: overview of other possible explanations for the link between cultural participation and cognitive functioning

Author (year)	Possible explanations
Arab et al. (2021)	Moderate physical activity and learning activities are both likely to involve large scale neural engagement in a range of activities, including movement-related learning and fine motor regulation. Physical activity and learning activities induce neuroplastic changes in the brain that counteract age-related cognitive decline.
Bolwerk et al. (2014)	One possible explanation is the combination of motor and cognitive (processing) processes with the personal, integrative experience of 'flow' (i.e., the participant is fully absorbed in the activity).
Brown et al. (2020)	Various mechanisms (in addition to social experiences) lead to a positive impact of cultural participation on cognition: the content of the activity (intellectually enriching and personally relevant); the facilitation of the activity (expertise, a well-qualified and trained teacher-artist); and the participants' own intention to engage (initial interest, motivation, willingness to try, taking the programme seriously).
Chung et al. (2018)	Participation in theatre promotes deeper processing, focused or conscious attention, multitasking and new and multimodal stimulation, which contributes to improved cognitive functioning (Noice et al., 2004).
Mashinchi et al. (2024)	Characteristics of creative activities such as planning, problem-solving, motivation and project delivery (Hansdottir et al., 2022) improve cognitive functioning. Participation maintains or strengthens procedural memory networks, builds neural networks and helps participants to develop new cognitive strategies for problem-solving.
Petrovsky et al. (2022)	The multi-sensory experience of cultural participation (music lessons, for example, requires coordinated effort and communication between different parts of the brain and hemispheres) enhances brain plasticity and counteracts cognitive decline by offering participants learning opportunities and opportunities for personal growth and self-expression (Sutcliffe et al., 2020). Furthermore, positive subjective

	experiences such as cognitive stimulation, social connections and a positive self-image (Flatt et al., 2015) also account for part of this association.
Sugita et al. (2021)	The cognitively stimulating environment of cultural participation has a beneficial effect on neurogenesis in the hippocampus. Furthermore, cultural participation directly stimulates brain activity and thus helps to maintain the cognitive functioning of individuals.
Tan et al. (2021)	Activities in children's museums, such as free play and exploration, hands-on activities and symbolic play, stimulate children's symbolic thinking and facilitate cognitive development (Piaget, 1962; Miller, 2002). Rich and intensive play is a critical process that promotes children's cognitive development. Furthermore, interactions with adults and peers are also important, and experience-based learning will enhance both their interest in learning and their cognitive skills.

Table 7: Overview of measurement instruments for the cognitive value of culture

Measurement tool	Study	What is measured?
Telephone Interview for Cognitive Status (TICS)	Ike et al. (2023)	Cognitive functioning
Montreal Cognitive Assessment (MoCA) 5-minute protocol	Lin et al. (2022) Luo et al. (2023) Sangvanich et al. (2023) Yan et al. (2021) Masika et al. (2021; 2022)	Cognitive functioning

Mini-Mental State Examination (MMSE)	Lin et al. (2022) Luo et al. (2023) Pigliautile et al. (2018) Valdes et al. (2019) Yan et al. (2021) Sugita et al. (2021) Eekelaar et al. (2012) Young et al. (2015)	Cognitive functioning Cognitive impairment (Dementia)
Thai Mental State Examination (TMSE)	Sangvanich et al. (2023)	Cognitive functioning
Memory and Executive Screening (MES)	Yan et al. (2021)	Cognitive functioning
Penn CNB	Tang et al. (2020)	Cognition (executive functions, episodic memory, complex cognition, social cognition and sensomotor speed)
China-Wechsler Intelligence Scale for Children (C-WISC) • Quantity recognition • Calculation • Direction • Geometric puzzles • Classification	Tan et al. (2021)	Cognitive ability
Memory Index Subtests • Short-term memory • Long-term memory • Prospective memory	Arab et al. (2021)	Memory; cognitive function

Immediate and delayed verbal memory: word learning recall task	Fancourt & Steptoe (2018)	Memory; recall
Rey Auditory Verbal Learning Test (RAVLT) List Learning, Delayed Recall and Recognition Trial	Lee et al. (2019) Mahendran et al. (2018)	Memory
Auditory Verbal Learning Test (AVLT)	Lin et al. (2022) Luo et al. (2023) Yan et al. (2021)	Memory
Logical memory	Chung et al. (2018)	Episodic memory
East Boston Memory Test	Petrovsky et al. (2022)	Episodic memory
Word List Recall test	Soubelet (2011)	Episodic memory
Digit Span (WAIS) Backwards Forward and backwards Forward	Petrovsky et al. (2022) Chung et al. (2018) Lee et al. (2019) Yu et al. (2021) Mahendran et al. (2018)	Working memory Attention and working memory
Symbol Digit Modalities Test (SDMT)	Lin et al. (2022) Yan et al. (2021)	Attention

Working Memory Index based on scores on subtests of the WAIS-IV (Wechsler Adult Intelligence Scale – 4th Edition) • Block Design • Matrix Reasoning • Visual Puzzles	Mashinchi et al. (2014)	Working memory
Letter–Number Sequencing subtest from the Wechsler Adult Intelligence Scale III	Soubelet (2011)	Working memory
Perceptual Reasoning Index based on scores on subtests of the WAIS-IV (Wechsler Adult Intelligence Scale – 4th Edition) • Digit Span • Arithmetic	Mashinchi et al. (2014)	Perceptual reasoning
Symbol-Digit Test	Schindler et al. (2017)	Visual-spatial cognition
Wechsler Adult Intelligence Scale – 3rd edition (WAIS-III) Block Design	Lee et al. (2019) Mahendran et al. (2018) Yu et al. (2021)	Visual-spatial ability
Rey–Osterrieth Complex Figure Test	Lin et al. (2022)	Visual-spatial construction ability
fMRI – seed-voxel correlation analysis (SCA) in the posterior cingulate cortex (PCC/preCUN)	Bolwerk et al. (2014)	Default Mode Network (DMN)

Short German version of the Resilience Scale (RS-11)	Bolwerk et al. (2014)	Resilience to stress in older adults
Matrix Reasoning and Block Design subtests from the Wechsler Adult Intelligence Scale III	Soubelet (2011)	Fluency
Test of semantic fluency: think of words in a specific category	Fancourt & Steptoe (2018)	Semantic fluency
Rey Auditory Verbal Learning Test (RAVLT)	Yu et al. (2021)	Immediate and delayed verbal memory
Penn Emotion Identification Test	Tang et al. (2020)	Social cognition
Penn Emotion Differentiation Test	Tang et al. (2020)	Social cognition
Penn Age Differentiation Test	Tang et al. (2020)	Social cognition
Shape Trail Test (STT)	Lin et al. (2022) Luo et al. (2023) Yan et al. (2021)	Executive functions
Symbol Digit Modalities Test (SDMT)	Petrovsky et al. (2022) Luo et al. (2023)	Executive functions Attention and information processing speed
Colour Trails Test (CTT)	Lee et al. (2019) Mahendran et al. (2018)	Executive functions Divided attention

	Yu et al. (2021)	
Trail Making Test (A & B)	Brown et al. (2020)	Executive functions
Trail Making Test B (TMTB)	Chung et al. (2018)	Executive functions
Trail Making Test A (TMTA)	Chung et al. (2018)	Processing speed
Symbol Search subtest from the Wechsler Adult Intelligence Scale III	Chung et al. (2018) Soubelet (2011)	(Processing) speed
Symbol-Digit Test	Schindler et al. (2017)	Processing speed
Time to complete TMTA – time to complete TMTB	Brown et al. (2020)	Cognitive flexibility
Cognitive Flexibility Scale (CFS)	Brown et al. (2020)	Cognitive flexibility • Awareness of alternatives • Willingness to adapt • Self-efficacy regarding flexibility
Cognitive Reserve Scale (CRS)	Brown et al. (2020)	Cognitive reserve
Cognitive Reserve Index (CRI)	Pigliautile et al. (2018)	Cognitive reserve
Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)	Malinin et al. (2023)	Cognitive decline
Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE)	Fancourt et al. (2018)	Dementia

Clinical Dementia Rating Scale (CDR)	Pigliautile et al. (2018)	(Severity of) dementia
Six-Item Screener (SIS)	Danila et al. (2018)	Cognitive impairment
Colour Trails Test (CTT)	Yu et al. (2021)	(Mild) cognitive impairment
Nurses' Delirium Screening Scale (Nu-DESC)	Danila et al. (2018)	Delirium
Idea-generation task (including product design and brand naming) • Fluency • Originality	An & Youn (2018)	Creativity
Alternate or alternative uses task	Hoffmann et al. (2021) Sovansky et al. (2016)	Creative skill in generating ideas Divergent thinking
Remote Associates Test (RAT)	An & Youn (2018)	Creativity
Creative Personality Scale (CPS)	An & Youn (2018)	Creativity
Marmara Creative Thinking Dispositions Scale (MCTDS)	Baş et al. (2022)	Creativity (creative thinking)
Critical Thinking Disposition Scale (CTDS)	Baş et al. (2022)	Critical thinking

DT (Divergent Thinking) tests	Briguglio et al. (2022)	Divergent thinking
Torrance's Test of Creative Thinking (TTCT) • Graphical form (TCTTG) • Written form (TTCTW) • Figural activity 1	Egana-delSol (2023) Sowden et al. (2015)	Divergent thinking
Torrance's Thinking Creatively in Action and Movement (TCAM)	Gong et al. (2020)	Creativity
Abbreviated Torrance Test for Adults (ATTA)	Kuo & Tien (2022)	Creativity
Creativity assessment questionnaire using the 'cube model'	Zheng et al. (2021)	Creativity
The Test of Artistic Creativity or The Criteria of Development	Varl & Herzog (2021)	Creative development
Instances Task	Sowden et al. (2015)	Divergent thinking
Product Design Task	Sowden et al. (2015)	Creativity
Consensual Assessment Technique (CAT)	Cheng et al. (2022)	Creativity (story completion)
Idea Evaluation Self-Efficacy Measure	Cheng et al. (2022)	Creativity (confidence in one's own ability to generate new ideas)

Problem construction tasks	Hoffmann et al. (2021)	Creative problem-solving skills
Test for Creative Thinking – Drawing Production	Hui et al. (2015)	Figurative creativity
Story-Telling Test (STT)	Hui et al. (2015)	Verbal creativity
Scales for Rating the Behavioural Characteristics of Superior Students (SRBCSS)	Hui et al. (2015)	Creative characteristics in children (reported by parents)
4-item measure of employee creativity	Kuo & Tien (2022)	Creative achievement(s)
Verbal and Pictorial Creative Thinking (thinking activity technique)	Seheda & Tereschenko (2020)	Associative visual thinking
4 Associations (thinking activity technique)	Seheda & Tereschenko (2020)	Associative visual thinking
Circles (psycho-diagnostic technique)	Seheda & Tereschenko (2020)	Creative imagination
Verbal imagination (psycho diagnostic technique)	Seheda & Tereschenko (2020)	Creative imagination
Telephone Task	Mages (2018)	Imagination
Correction Test, or Can You Keep Your Attention? (diagnostic technique)	Seheda & Tereschenko (2020)	Artistic observation

Selectivity of attention (diagnostic technique)	Seheda & Tereschenko (2020)	Artistic observation
Recognising figures (diagnostic technique)	Seheda & Tereschenko (2020)	Artistic observation
Image memory, or how to distinguish an object from its image (diagnostic technique)	Seheda & Tereschenko (2020)	Artistic observation
Recognising figures (technique used in music lessons)	Seheda & Tereschenko (2020)	Artistic observation
Image memory	Seheda & Tereschenko (2020)	Artistic observation
Kids Insight into Dementia Survey (KIDS) scale	Burns et al. (2021)	Knowledge about dementia
Rabbit-Fox Test	Mages (2018)	*Theory of Mind* ability
Verbal Fluency Test (VFT)	Lin et al. (2022) Luo et al. (2023) Yan et al. (2021)	Language (proficiency)
Boston Naming Test (BNT)	Lin et al. (2022) Luo et al. (2023) Yan et al. (2021)	Language (proficiency)

Peabody Picture Vocabulary Test (PPVT-III) Peabody Picture Vocabulary Test, 4th Edition (PPVT-4)	Mages (2018) Bojczyk et al. (2015) Bojczyk et al. (2017)	Language (skills): receptive vocabulary
Mages Measure of Story Comprehension (MMSC)	Mages (2018)	Language (skill): listening comprehension
Diagnostic Evaluation of Language Variation (DELV)	Mages (2018)	Language (skill): narrative production
Test of Early Reading Ability – Third Edition (TERA-3)	Bojczyk et al. (2015)	Early reading and writing skills
Kaufman Brief Intelligence Test – 2nd Edition (KBIT-2)	Bojczyk et al. (2017)	Literacy
Expressive Vocabulary Test, 2nd Edition (EVT-2)	Bojczyk et al. (2017)	Vocabulary
Woodcock Reading Mastery R/NU (WRMT-R/NU) • Letter Identification • Word Identification • Word Attack • Passage Comprehension	Bojczyk et al. (2017)	Reading skills
Reading Motivational Scale	Chiu et al. (2015)	Reading motivation
Reading Behaviour Scale	Chiu et al. (2015)	Reading behaviour

Peabody Individual Achievement Tests (PIAT)	Jæger (2011)	Academic performance: reading skills, reading comprehension and numeracy
Information Literacy Assessment & Advocacy Project (ILAAP)	Johnson & Reed (2023)	Information literacy
Picture Symbol Test (NEPS-BZT) & Matrices Test (NEPS-MAT) or NEPS (National Educational Panel Study)	Mikus et al. (2020)	Fluid intelligence: perceptual speed & reasoning
British Picture Vocabulary Scale (BPVS-3)	Van Tonder et al. (2019)	Receptive vocabulary
Comprehensive Test of Phonological Processing (CTOPP-2)	Van Tonder et al. (2019)	Phonological processing skills (reading)
York Assessment of Reading Comprehension (YARC)	Van Tonder et al. (2019)	Reading comprehension

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