

Supplementary Material

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Database (Search date)	Step	Search Strategy	Number of Results
PubMed (15.6.2024)	#1	(Aging[mh] OR Senescence[mh] OR Biological Aging[mh] OR Aging, Biological[mh] OR "Aging"[all] OR "Senescence"[all] OR "Biological Aging"[all] OR "Aging, Biological"[all])	602,746
	#2	(Imaging, Diffusion Tensor[mh] OR Diffusion Tensor Magnetic Resonance Imaging[mh] OR Diffusion Tensor MRI[mh] OR MRI, Diffusion Tensor[mh] OR DTI MRI[mh] OR Diffusion Tractography[mh] OR Tractography, Diffusion[mh] OR "Imaging, Diffusion Tensor"[all] OR "Diffusion Tensor Magnetic Resonance Imaging"[all] OR "Diffusion Tensor MRI"[all] OR "MRI, Diffusion Tensor"[all] OR "DTI MRI"[all] OR "Diffusion Tractography"[all] OR "Tractography, Diffusion"[all])	15,691
	#3	((Aging[mh] OR Senescence[mh] OR Biological Aging[mh] OR Aging, Biological[mh] OR "Aging"[all] OR "Senescence"[all] OR "Biological Aging"[all] OR "Aging, Biological"[all]) AND (Imaging, Diffusion Tensor[mh] OR Diffusion Tensor Magnetic Resonance Imaging[mh] OR Diffusion Tensor MRI[mh] OR MRI, Diffusion Tensor[mh] OR DTI MRI[mh] OR Diffusion Tractography[mh] OR Tractography, Diffusion[mh] OR "Imaging, Diffusion Tensor"[all] OR "Diffusion Tensor Magnetic Resonance Imaging"[all] OR "Diffusion Tensor MRI"[all] OR "MRI, Diffusion Tensor"[all] OR "DTI MRI"[all] OR "Diffusion Tractography"[all] OR "Tractography, Diffusion"[all]))	1,098
Scopus (15.6.2024)	#1	TITLE-ABS-KEY ("Aging" OR "Senescence" OR "Biological Aging" OR "Aging, Biological")	1,214,130
	#2	TITLE-ABS-KEY ("Imaging, Diffusion Tensor" OR "Diffusion Tensor Magnetic Resonance Imaging" OR "Diffusion Tensor MRI" OR "MRI, Diffusion Tensor" OR "DTI MRI" OR "Diffusion Tractography" OR "Tractography, Diffusion")	3,197
	#3	#1 AND #2	158
Web of Science (15.6.2024)	#1	TS=("Aging" OR "Senescence" OR "Biological Aging" OR "Aging, Biological")	454,011
	#2	TS=("Imaging, Diffusion Tensor" OR "Diffusion Tensor Magnetic Resonance Imaging" OR "Diffusion Tensor MRI" OR "MRI, Diffusion Tensor" OR "DTI MRI" OR "Diffusion Tractography" OR "Tractography, Diffusion")	3,580
	#3	#1 AND #2	114
medRxiv (15.6.2024)	#1	"Aging" AND "Imaging, Diffusion Tensor" "Senescence" AND "Diffusion Tensor Magnetic Resonance Imaging" "Biological Aging" AND "Diffusion Tensor MRI" "Aging, Biological" AND "DTI MRI" "Aging" AND "Diffusion Tractography"	262
Google Scholar (15.6.2024)	#1	("Aging" OR "Senescence" OR "Biological Aging" OR "Aging, Biological") AND ("Imaging, Diffusion Tensor" OR "Diffusion Tensor Magnetic Resonance Imaging" OR "Diffusion Tensor MRI" OR "MRI, Diffusion Tensor" OR "DTI MRI" OR "Diffusion Tractography" OR "Tractography, Diffusion")	16,600
Total Results			1632
Duplicates			154
Final Results			1478

Table S1. Search strategy used with the four databases.

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Table S2. Quality assessment of the included cross-sectional studies.

Study ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Overall score	Overall bias
Voineskos (2012) (42)	yes	yes	yes	unclear	yes	yes	yes	unclear	6/8	Some concerns
Wolf Dominik (2014) (27)	yes	unclear	yes	yes	yes	yes	unclear	yes	6/8	Some concerns
S. Hirsiger (2016) (32)	yes	yes	yes	unclear	yes	yes	yes	yes	7/8	Some concerns
D. Kim (2019) (41)	yes	yes	yes	yes	yes	yes	yes	yes	8/8	Low risk
O. Ajilore (2014) (26)	yes	yes	yes	yes	unclear	yes	yes	unclear	6/8	Some concerns
T. Hinault (2019) (40)	yes	yes	yes	yes	yes	unclear	yes	yes	7/8	Some concerns
Martin Ystad (2011) (38)	unclear	no	yes	yes	yes	yes	yes	yes	6/8	High risk
J. M. Gullett (2020) (34)	yes	yes	yes	yes	yes	yes	yes	unclear	7/8	Some concerns
J. G. Hakun (2015) (28)	yes	yes	yes	yes	yes	yes	yes	yes	8/8	Low risk
I. J. Bennett (2016) (31)	yes	yes	yes	unclear	no	yes	yes	yes	6/8	High risk
Barbara B. Bendlin (2010) (21)	yes	yes	yes	yes	yes	unclear	unclear	yes	6/8	Some concerns
Li Xin (2020) (39)	yes	unclear	yes	yes	yes	yes	yes	unclear	6/8	Some concerns
Jan Willem Koten Jr (2023) (19)	yes	yes	yes	yes	yes	yes	yes	unclear	7/8	Some concerns
R.A. Charlton (2006) (20)	yes	yes	yes	yes	yes	yes	yes	yes	8/8	Low risk
K. Kantarci, M (2011) (22)	yes	yes	yes	yes	yes	yes	yes	unclear	7/8	Some concerns
G. A. Kerchner (2012) (23)	yes	yes	yes	yes	unclear	yes	yes	yes	7/8	Some concerns
Stuart J. Ritchie (2015) (30)	unclear	yes	unclear	yes	yes	yes	yes	unclear	5/8	Some concerns
K. M. Hawkins (2015) (29)	yes	yes	yes	no	yes	yes	yes	yes	7/8	High risk
S. J. Teipel (2010) (37)	yes	unclear	yes	yes	yes	yes	yes	yes	7/8	Some concerns
Colleen Lacey (2024) (43)	yes	yes	yes	yes	yes	yes	yes	unclear	7/8	Some concerns

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Q1: Were the criteria for inclusion in the sample clearly defined?

Q2: Were the study subjects and the setting described in detail?

Q3: Was the exposure measured in a valid and reliable way?

Q4: Were objective, standard criteria used for measurement of the condition?

Q5: Were confounding factors identified?

Q6: Were strategies to deal with confounding factors stated?

Q7: Were the outcomes measured in a valid and reliable way?

Q8: Was appropriate statistical analysis used?

RoB2 overall risk of bias judgment

Low risk of bias → The study is judged to be at low risk of bias for all domains for this result.

Some concerns → The study is judged to raise some concerns (to be unclear) in at least one domain for this result, but not to be at high risk of bias (not following the requirements of some questions) for any domain.

High risk of bias → The study is judged to be at high risk of bias in at least one domain, or to have some concerns for multiple domains in a way that substantially lowers confidence in the result.

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Table S3. Quality assessment of the other included cohort studies.

Study ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Overall score	Overall bias
Evan Fletcher (2013) (24)	yes	yes	yes	unclear	yes	yes	yes	unclear	yes	yes	yes	9/11	Some concerns
A. Soldan (2022) (35)	unclear	yes	yes	unclear	yes	unclear	yes	yes	yes	unclear	yes	7/11	Some concerns
G. Grande (2023) (36)	yes	yes	unclear	yes	yes	yes	yes	yes	yes	yes	yes	10/11	Some concerns
M. Edde (2020) (33)	yes	unclear	yes	yes	yes	yes	unclear	yes	unclear	yes	yes	8/11	Some concerns
E. Sasson (2013) (25)	yes	yes	yes	yes	unclear	yes	yes	yes	no	no	yes	8/11	High risk

Q1: Were the two groups similar and recruited from the same population?

Q2: Were the exposures measured similarly to assign people to both exposed and unexposed groups?

Q3: Was the exposure measured in a valid and reliable way?

Q4: Were confounding factors identified?

Q5: Were strategies to deal with confounding factors stated?

Q6: Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?

Q7: Were the outcomes measured in a valid and reliable way?

Q8: Was the follow up time reported and sufficient to be long enough for outcomes to occur?

Q9: Was follow up complete, and if not, were the reasons to loss to follow up described and explored?

Q10: Were strategies to address incomplete follow up utilized?

Q11: Was appropriate statistical analysis used?

RoB2 overall risk of bias judgment

Supplementary Material

Low risk of bias → The study is judged to be at low risk of bias for all domains for this result.

Some concerns → The study is judged to raise some concerns (to be unclear) in at least one domain for this result, but not to be at high risk of bias (not following the requirements of some questions) for any domain.

High risk of bias → The study is judged to be at high risk of bias in at least one domain, or to have some concerns for multiple domains in a way that substantially lowers confidence in the result.

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Table S4. Baseline characteristics of the included studies.

Study ID	Title	Age interval (years)	Result	Conclusion	Limitation
A. N. Voineskos (2012) (42)	Age-related decline in white matter tract integrity and cognitive performance: a DTI tractography and structural equation modeling study	18–65	The integrity of the inferior longitudinal fasciculus (ILF), inferior occipitofrontal fasciculus (IFOF), and posterior corpus callosum (CC5) predicted visuomotor dexterity, visuospatial construction, and memory/executive function, respectively. The corpus callosum also showed an anteroposterior gradient of age-related decline, with greater reduction in the genu than in the splenium.	These findings suggest that the ILF may support visual processing, the IFOF may mediate interactions among visual, spatial, and executive functions, and the CC5 may contribute to memory and executive function through interhemispheric communication.	The study was limited by its relatively small sample, lack of longitudinal data, single-tensor modeling, possible tractography and clustering errors, a priori tract selection, and potential confounding from education, health status, and genetic factors.
Evan Fletcher, 2013 (24)	Loss of fornix white matter volume as a predictor of cognitive impairment in cognitively normal elderly individuals	60–89	Fornix body volume and axial diffusivity were significant predictors of cognitive decline from normal cognition. Hippocampal volume was not a significant predictor, although it was related to fornix volume and diffusivity.	The findings suggest that fornix degeneration may reflect early disruption of the broader hippocampus–fornix circuit and could serve as a biomarker of incipient cognitive decline.	The study was limited by the small number of converters, hand-drawn hippocampal ROIs, and the lack of longitudinal cognitive and biomarker data.
Wolf Dominik (2014) (27)	Age-Related Increases in Stroop Interference: Delineation of General Slowing Based on Behavioral and White Matter Analyses	22–85	Stroop interference increased with age and remained partly independent of general slowing. It was negatively associated with FA and positively associated with MD in several frontal white matter regions, including the genu and body of the corpus callosum and the bilateral anterior corona radiata.	The results indicate that age-related inhibition deficits are not simply the result of general slowing, but are linked to specific white matter pathways supporting cognitive control.	The study was cross-sectional and limited by sample composition, sensitivity of TBSS in regions with crossing fibers, and the absence of a truly lifespan-balanced sample.

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S. Hirsiger, 2016 (32)	Structural and functional connectivity in healthy aging: Associations for cognition and motor behavior	64–85	Structural and functional connectivity of the cingulum bundle were not related to each other or to cognitive performance. Structural connectivity was associated with grip force, whereas functional connectivity was associated with processing speed and motor speed.	Structural and functional connectivity appear to play different roles in supporting cognition and motor behavior in healthy aging.	The study was limited by its small sample, restricted age range, cross-sectional design, single seed-based FC analysis, and lack of a direct myelin measure.
D. Kim, 2019 (41)	Diffusion tensor imaging reveals abnormal brain networks in elderly subjects with subjective cognitive deficits	N/A	Elderly individuals with subjective cognitive deficits showed altered subnetworks in regions including the superior parietal gyrus, angular gyrus, precuneus, posterior cingulum, putamen, precentral gyrus, postcentral gyrus, and paracentral lobule. These changes were associated with performance on recall and naming tests.	Network-based statistics may help identify subtle brain network changes in subjective cognitive decline and may aid early detection of Alzheimer’s disease progression.	The study was limited by its small sample, lack of longitudinal follow-up, group heterogeneity, possible confounding by age, education, and depression, and the need for validation of the NBS method in larger cohorts.
O. Ajilore, 2014 (26)	Association of brain network efficiency with aging, depression, and cognition	30–88	Global network efficiency declined with age in both healthy and depressed participants. Normalized global efficiency was inversely related to depression severity, and native and integrated efficiency were associated with poorer object alternation performance in the depressed group.	The findings suggest that aging and depression are associated with reduced network integration, while local efficiency may be more sensitive to regional alterations than traditional structural measures.	The cross-sectional design limits causal inference. Deterministic tractography and binary network construction may introduce bias, and the sample size and heterogeneity may reduce generalizability.
T. Hinault, 2019 (40)	Age-related differences in the structural and effective connectivity of cognitive control: A combined fMRI	18–34; 65–85	Both age groups showed arithmetic interference, but the effect of working-memory updating on inhibition was absent in older adults. Older adults also showed greater	White matter microstructure appears to play an important role in preserving cognitive control with age, and the relevant pathways may differ	The study was limited by its small sample, lack of separate working-memory and inhibition measures, and limited control

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	and DTI study of mental arithmetic.		prefrontal activation, reduced fronto-posterior effective connectivity, and lower white matter microstructure than younger adults.	between younger and older adults.	for other factors affecting cognitive aging.
A. Soldan, 2022 (35)	Actigraphy-estimated physical activity is associated with functional and structural brain connectivity among older adults	N/A	Higher physical activity levels were associated with better structural and functional connectivity in older adults, independent of age, sex, education, diagnosis, APOE4 status, vascular risk, and cognitive reserve. Physical activity was not associated with white matter hyperintensity volume.	These findings suggest that physical activity may help preserve brain connectivity and reduce the risk of cognitive decline in later life.	The study was cross-sectional and did not capture activity type, intensity, or duration. It was also limited by possible confounding from sleep, circadian rhythm, and residual bias.
Martin Ystad, 2011 (38)	Cortico-striatal connectivity and cognition in normal aging: A combined DTI and resting state fMRI study	49–80	The structural integrity of fiber bundles connecting subcortical nuclei and cortical resting-state networks was associated with executive function and processing speed. The putamen showed the strongest cortical connectivity, and pathways involving the putamen and dorsal attention network were most strongly related to executive function.	Subcortical–cortical fiber bundles appear to play an important role in resting-state network communication and cognition during aging.	The study was cross-sectional and lacked a younger comparison group. Additional limitations included tractography variability and possible confounding from education, lifestyle, and genetics.
J. M. Gullett, 2020 (34)	The association of white matter free water with cognition in older adults	65–85	Higher extracellular free water in white matter was associated with poorer fluid cognitive performance. The association was strongest in the angular and cingulum bundles, corticospinal tract, and superior longitudinal fasciculus.	Free water may be a stronger marker of cognitive aging than FA and may reflect early microstructural or inflammatory changes in white matter.	The study was limited by a relatively small sample, cross-sectional design, single-shell diffusion data, and lack of direct physiological validation of free water estimates.
J. G. Hakun, 2015 (28)	Longitudinal Alterations to Brain Function,	60	Older adults showed increased frontal activation over time,	The findings support the compensation theory of	The sample was small, there was no younger control

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	Structure, and Cognitive Performance in Healthy Older Adults: a fMRI-DTI study		reduced white matter microstructure in frontal commissural and association tracts, and slower task-switching performance. These changes were related across imaging and behavioral measures.	neurocognitive aging, suggesting that increased frontal recruitment may help maintain performance despite structural decline.	group, and the study relied on a single task-switching paradigm and one DTI metric, FA.
I. J. Bennett, 2016 (31)	Mnemonic discrimination relates to perforant path integrity: An ultra-high resolution diffusion tensor imaging study	20–87	Perforant path integrity was positively associated with mnemonic discrimination across the lifespan. This relationship was specific to the perforant path and was not observed for other cognitive measures or tracts.	The results highlight the importance of the perforant path and broader medial temporal lobe circuitry in pattern separation and memory discrimination.	The cross-sectional design prevented causal inference, and fiber crossing made tract separation difficult even with ultra-high-resolution imaging.
Barbara B. Bendlin, 2010 (21)	White Matter in Aging and Cognition: A Cross-sectional Study of Microstructure in Adults Aged Eighteen to Eighty-Three	18–83	White matter microstructure was associated with age and with declines in processing speed, working memory, and visual memory. These relationships were observed independently of white matter volume.	White matter deterioration may reduce the efficiency of information transfer between brain regions and contribute to cognitive aging.	The study was cross-sectional and could not establish causality or track longitudinal change. It was also limited by potential confounding from vascular, genetic, and lifestyle factors.
Li Xin, 2020 (39)	Age-Related Decline in the Topological Efficiency of the Brain Structural Connectome and Cognitive Aging	45–86	Topological efficiency, modularity, and hub integration declined with age, especially in frontal, parietal, and superior temporal regions. Network efficiency was positively associated with attention and executive function and mediated age-related cognitive decline.	The structural connectome may provide useful imaging markers for predicting cognitive function and understanding age-related cognitive decline.	The study was cross-sectional, used deterministic tractography, and may have been influenced by head motion, sample heterogeneity, and limited generalizability.
Jan Willem Koten Jr, 2023 (19)	An attempt to model the causal structure behind white matter aging and cognitive decline	18–39; 40–59; 60–89	Voxel-wise structural equation modeling supported both the independent factor model and the cognitive mediation model. Most voxels fit the	The results suggest that age, white matter, and cognition may be linked through multiple mechanisms, with some regions showing cognitive mediation	The study was limited by sample size, the use of FA and MD only, abstract model definitions, and the

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			independent factor model, while a smaller subset supported cognitive mediation, especially in commissural fibers and superficial white matter.	and others reflecting independent age effects.	inherent noise of the measures.
G. Grande, 2023 (36)	Brain Changes and Fast Cognitive and Motor Decline in Older Adults	60–96	Participants with concurrent cognitive and motor decline showed the greatest tissue loss, ventricular enlargement, white matter hyperintensity burden, and lower baseline white matter integrity. Isolated cognitive decline was mainly associated with hippocampal atrophy, while isolated motor decline was linked to white matter lesions.	Combined cognitive and motor decline appears to reflect mixed gray- and white-matter pathology, whereas isolated decline patterns may reflect more specific disease pathways.	Generalizability was limited by the healthy, well-educated study population. The study also relied on global measures such as MMSE and gait speed and did not include other relevant neuroimaging markers.
R.A. Charlton, 2006 (20)	White matter damage on diffusion tensor imaging correlates with age-related cognitive decline	50–90	White matter damage measured by DTI was associated with age-related cognitive decline in healthy middle-aged and older adults. FA decreased and MD increased with age, and both were related to executive function, working memory, and information-processing speed. NAA also correlated with DTI measures, suggesting that axonal loss may underlie these changes.	The findings support the disconnection hypothesis of cognitive aging, indicating that white matter damage may disrupt communication between brain regions and contribute to cognitive dysfunction.	The study was cross-sectional, used a single slice thickness for DTI, did not correct for multiple comparisons, relied on metabolite ratios rather than absolute concentrations for MRS, and may not generalize well to other populations.
K. Kantarci, 2011 (22)	Diffusion tensor imaging and cognitive function in older adults with no dementia	52–95	Memory and language were associated with both cortical MD and white matter FA in temporal regions, whereas attention-executive and visuospatial functions were linked mainly to	The posterior cingulum appears to be an important connectivity hub for cognitive networks, and disruption of white matter integrity may occur early in the course of	The study was limited by its cross-sectional design, lack of pathological confirmation, single-tensor modeling, possible confounding from vascular risk factors

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			white matter FA in frontal and parietal regions. Posterior cingulum FA was associated with all four cognitive domains.	neurodegenerative change.	and white matter lesions, and a relatively small and heterogeneous sample.
G. A. Kerchner, 2012 (23)	Cognitive processing speed in older adults: relationship with white matter integrity	55–87	Cognitive processing slowed with age and was linked to reduced white matter integrity on DTI. Age, processing speed, and cerebral white matter integrity were significantly related.	Decline in white matter integrity may reduce the efficiency of information transfer across brain regions and contribute to slower cognitive processing in aging.	The age distribution was uneven, the definition of normal aging was narrow, some information was lost during image coregistration, and the cross-sectional design prevented causal inference.
M. Edde, 2020 (33)	Free water: A marker of age-related modifications of the cingulum white matter and its association with cognitive decline	75.1–92.9	Free-water correction improved the sensitivity and specificity of conventional DTI measures in the cingulum bundle, and these corrected measures were more strongly associated with 12-year verbal fluency decline. Free water content and MD were independently related to decline.	Both tissue-related and non-tissue-related factors may contribute to cognitive decline in aging, and free-water correction can improve the interpretation of DTI metrics.	The study had a moderate sample size, analyzed the cingulum as a single structure, used a single b-value acquisition, and lacked direct histological or physiological validation of free water estimates.
Stuart J. Ritchie, 2015 (30)	Coupled changes in brain white matter microstructure and fluid intelligence in later life	72.49–76.25	Changes in white matter microstructure were coupled with changes in fluid intelligence, but not with processing speed or memory. Higher baseline FA was associated with less later decline in processing speed, and FA decline was most pronounced in the anterior thalamic radiation and uncinate fasciculus.	The study provides longitudinal evidence linking white matter microstructure to fluid intelligence in later life and supports the disconnection hypothesis of cognitive aging.	Follow-up was relatively short, confounding factors were not fully addressed, only FA was used as the DTI marker, and selection and attrition bias may have influenced the sample.
K. M. Hawkins, 2015 (29)	Diffusion tensor imaging correlates of cognitive-motor decline in	23–31; 49–69	Older adults at higher Alzheimer’s risk showed more extensive white matter decline than low-risk older adults and	White matter disruption in tracts connecting medial temporal, frontal, and parietal regions may	The sample was small, the design was cross-sectional, there were no male participants, AD risk

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	normal aging and increased Alzheimer's disease risk		young adults. Lower white matter integrity was also associated with poorer performance on a cognitively demanding visuomotor task.	occur early in Alzheimer's disease and may affect complex visuomotor performance.	was estimated indirectly, and vascular health, education, and lifestyle may have confounded the results.
S. J. Teipel, 2010 (37)	Longitudinal changes in fiber tract integrity in healthy aging and mild cognitive impairment: a DTI follow-up study	59–88	FA declined longitudinally in healthy older adults, especially in intracortical projecting tracts such as the cingulum bundle, uncinate fasciculus, superior longitudinal fasciculus, inferior fronto-occipital fasciculus, and corpus callosum. In MCI, the strongest FA reduction was seen in the anterior corpus callosum.	The pattern of FA reduction suggests that age-related white matter deterioration begins in later life and that early corpus callosum involvement may reflect increased risk for Alzheimer's disease.	The sample was relatively small and heterogeneous, the DTI acquisition used a single b-value and limited gradient directions, and variation across scanners and sites may have affected comparability.
E. Sasson, 2013 (25)	White matter correlates of cognitive domains in normal aging with diffusion tensor imaging	25–82	DTI measures were associated with cognitive performance across multiple temporal projections. Significant relationships were shown using tables, scatterplots, and statistical parametric maps.	The results help clarify the functional localization of white matter pathways and their contribution to age-related cognitive change.	The study faced common DTI limitations, including tractography subjectivity, imperfect registration, partial volume effects, and uncertainty about the biological meaning of diffusion measures.
Colleen Lacey, 2024 (43)	Impact of APOE-ε alleles on brain structure and cognitive function in healthy older adults: A VBM and DTI replication study	70	No significant relationships were found between cognitive tests and imaging measures within either APOE group. Structural differences in gray matter volume and white matter integrity were, however, observed across APOE genotypes.	The study replicated structural brain differences between APOE groups, but did not replicate prior cognitive findings.	The ADNI dataset had limited measures, the APOE2 subgroup was small, and differences in software and analysis pipelines may have affected replication.

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Table S5. Diffusion tensor imaging (DTI) characteristics in the included studies.

Study ID	Field strength	b-value	FA, MD, RD, AD alternations
A. N. Voineskos (2012) (42)	3T	1000 s /mm ²	The study used fractional anisotropy (FA) and mean diffusivity (MD) as indicators of white matter integrity. FA reflects the degree of directional diffusion, whereas MD represents the average diffusion across all directions. Specific alterations in these metrics were not reported in the provided excerpt.
Evan Fletcher, 2013 (24)	N/A	1000 s /mm ²	Axial diffusivity emerged as a significant predictor of cognitive decline, with higher axial diffusivity linked to greater risk. However, the excerpt does not provide detailed changes in FA, MD, RD, or AD.
Wolf Dominik (2014) (27)	3T	1000 s /mm ²	The study assessed white matter FA and MD, but no specific changes in RD or AD were described in the available context.
S. Hirsiger, 2016 (32)	3T	1000 s /mm ²	N/A
D. Kim, 2019 (41)	3T	1000 s /mm ²	The article does not explicitly report alterations in FA, MD, RD, or AD. It focuses on abnormal brain subnetworks and connectivity, which may reflect underlying diffusion changes.
O. Ajilore, 2014 (26)	3T	700 s /mm ²	The study emphasizes network efficiency derived from DTI tractography and does not report specific FA, MD, RD, or AD alterations.
T. Hinault, 2019 (40)	3T	1000 s /mm ²	White matter microstructure, particularly FA, was associated with cognitive control performance. The excerpt does not describe specific MD, RD, or AD changes.
A. Soldan, 2022 (35)	3T	700 s /mm ²	Higher physical activity was associated with higher FA and lower RD, suggesting better white matter integrity. MD and AD were not specifically reported.
Martin Ystad, 2011 (38)	1.5 T	1000 s /mm ²	FA in selected fiber bundles showed strong correlations with executive function and processing speed. No specific MD, RD, or AD alterations were described.
J. M. Gullett, 2020 (34)	3T	1000 s /mm ²	The study examined associations between cognition and diffusion metrics such as FA, but it did not specify detailed changes in MD, RD, or AD.
J. G. Hakun, 2015 (28)	3T	1000 s /mm ²	Longitudinal reductions in FA were observed in multiple frontal white matter regions. Changes in MD, RD, and AD were not detailed in the excerpt.
I. J. Bennett, 2016 (31)	3T	1200 s /mm ²	The article mentions diffusion and anisotropy-based integrity metrics, but specific FA, MD, RD, or AD alterations were not provided.
Barbara B. Bendlin, 2010 (21)	3T	N/A	Aging was associated with decreased FA and increased MD. RD and AD were not explicitly discussed in the provided context.
Li Xin, 2020 (39)	3T	N/A	The article reports age-related decline in white matter integrity, mainly reflected by changes in FA, but does not detail MD, RD, or AD.

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Jan Willem Koten Jr, 2023 (19)	3T	1000 s /mm ²	The study used FA and MD as measures of white matter integrity. It also referenced AD and RD, but no specific alterations were reported.
G. Grande, 2023 (36)	N/A	N/A	Lower white matter integrity, reflected by worse baseline MD, was associated with concurrent cognitive and motor decline. FA, RD, and AD were not specifically detailed.
R.A. Charlton, 2006 (20)	1.5 T	1000 s /mm ²	FA declined and MD increased with age. These diffusion changes were linked to cognitive function and may reflect axonal loss. RD and AD were not specifically addressed.
K. Kantarci, 2011 (22)	3T	1000 s /mm ²	Cortical MD increased and FA decreased with microstructural degeneration. RD and AD were not explicitly discussed.
G. A. Kerchner, 2012 (23)	3T	2000 s /mm ²	Cognitive processing speed correlated with FA, MD, and RD, but not with AD.
M. Edde, 2020 (33)	3T	1000 s /mm ²	Free-water correction increased FA and decreased MD, RD, and AD, indicating alterations in white matter microstructure with aging.
Stuart J. Ritchie, 2015 (30)	1.5 T	1000 s /mm ²	FA was used as a marker of directional diffusion and white matter efficiency. MD, RD, and AD were not detailed in the excerpt.
K. M. Hawkins, 2015 (29)	3T	1000 s /mm ²	Age-related white matter decline was associated with significant differences in FA, RD, and AD, while MD did not differ significantly between groups.
S. J. Teipel, 2010 (37)	3T	1000 s /mm ²	Longitudinal declines in FA were observed across several fiber tracts. Specific MD, RD, and AD changes were not reported.
E. Sasson, 2013 (25)	3T	1000 s /mm ²	The article examined associations between cognition and diffusion parameters, including FA, MD, RD, and AD, with changes varying by cognitive domain.
Colleen Lacey, 2024 (43)	N/A	N/A	The study focused on FA and MD and reported structural differences in white matter integrity and gray matter volume across APOE genotypes.

Abbreviations: N/A: not applicable.