**Table 1. Characteristics of studies examining cross-sectional and longitudinal cognitive predictors of psychosocial function**

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| Cross-sectional cognitive predictors of psychosocial function | | | | |
| Author | **Sample characteristicsa** | **Cognitive measures** | **Functional measuresb** | **Main Findingsc** |
| Achim et al., 20121 | First-episode psychosis (FEP) non-affective  DSM-IV  N=31  Age: 24.9 (4.5)  Male: 26 (83.87%) | *Mentalising/ToM*:  Hinting task, False Belief task, Faux-pas test, Strange Stories Test | SOFAS | Social cognition: + |
| Addington et al., 20052 | FEP non-affective  DSM-IV  <3 months treatment  N=247  Age: 24.5 (8.2)  Male: 168 (68.02%) | *Cognitive composite score:*  *Attention*: Continuous Performance Task (CPT)  *EF*: Trail Making Test (TMT) A & B  *Information processing*: Span of apprehension (SPAN)  *PS:* Stroop  *Verbal fluency*: Controlled oral word association test (COWAT), category fluency (category instances)  *verbal memory*: Logical Memory (LM) subtests of Wechsler Memory Scale - Revised (WMS-R), Rey auditory verbal learning test (RAVLT)  *visual memory*: Rey-Osterrieth complex figure test (RCFT)  *working memory*: Letter-Number Span, Wisconsin card sorting task (WCST) | QLS | General cognition: + |
| Addington et al., 2006a3 | FEP non-affective  DSM-IV  <3 months treatment  N=50  Age: 25.1 (8)  Male: 30 (60%) | *Cognitive composite score:*  *Attention:* CPT  *PS:* SPAN, TMT A&B, STROOP  *Verbal fluency*: COWAT, category fluency  *Verbal memory*: LM WMS-R, RAVLT  *Visual memory*: RCFT  *WM:* Letter number span, WCST  *Social cognition:*  Facial Emotion Identification Test (FEIT) and the Facial Emotion Discrimination Test (FEDT) | QLS | General cognition: +  Social cogntion: + |
| Addington et al., 2006b4 | FEP non-affective  DSM-IV  <3 months treatment  N=50  Age: 25.1 (8.0)  Male: 30 (60%) | *Cognitive composite score:*  *Attention:* CPT  *PS:* SPAN, TMT A&B, STROOP  *Verbal fluency*: COWAT, category fluency  *Verbal memory*: LM WMS-R, RAVLT  *Visual memory*: RCFT  *WM:* Letter number span, WCST  *Social cognition*:  *Social knowledge*: Situational Features Recognition Test  *Social perception*: Social Cue Recognition Test | QLS | General cogntion: +  Social cognition: + |
| Bratlien et al., 20125 | FEP non-affective  DSM-IV  <12 weeks antipsychotic treatment  N=166  Age: 27.8 (8.5)  Male: 105 (63%) | *EF:* Colour-Word Interference test (CWI) in Delis-Kaplan Executive Function System (D-KEFS)  *PS:* digit symbol  *Verbal memory*: California verbal learning test (CVLT-II)  *WM:* Letter number sequencing (LNS) from the Wechsler Adult Intelligence Scale (WAIS-III) | SFS | EF: -  PS: +  VeM: -  WM: - |
| Clayson et al., 20196 | First-episode schizophrenia (FES)  DSM-IV  First episode within 2 years  N=63  Age: 22.7 (3.5)  Male: 46 (73.02%) | *EF:* WCST  *Social cognition:*  *Emotion recognition:* FEIT | Global Functioning Scale: Role | EF: +  Social cognition: + |
| Davies et al., 20177 | FEP  N=80  Age: 26.08 (5.53)  Male: 49 (61.25%) | *EF:* verbal fluency, TMT  *IQ:* Wechsler abbreviated scale of intelligence (WASI)  *Metacognition*: Metacognitive awareness inventory (MAI), Beck cognitive insight scale (BCIS)  *Verbal memory*: LM WMS-III  *WM:* LNS  *Neurocognition:* Principle component analysis (PCA) | TUS  UPSA | General cognition: +  Metacognition: + |
| Faerden et al., 20138 | FEP  DSM-IV  <1 year treatment  N=64  Age: 27.9 (8.4)  Male: 36 (56%) | *Attention:* digit span forward  *EF:* Verbal fluency, Category fluency, Set shifting, Inhibition  *IQ:* WASI full scale IQ  *Premorbid IQ:* National adult reading test (NART)  *PS:* digit symbol  *Verbal memory:* CVLT-II  *Visual memory:* RCFT  *WM:* Letter number span forward (WAIS-III) | GAF | A: -  EF: -  IQ: -  PS: -  VeM: +  VisM: -  WM: - |
| Gonzalez-Blanch et al., 20119 | FEP non-affective  DSM-IV  N=131  Age: 26.8 (7.3)  Male: 85 (64.9%) | *Attention:* CPT, brief test of attention  *EF:* TMT A & B, Digit Span-backward  *PS:* cancellation test, digit symbol coding  *Verbal comprehension:* WAIS-III verbal comprehension subtests  *Verbal memory*: RAVLT  *Visual memory*: RCFT | DAS | A: -  EF: +  PS: +  VeC: -  VeM: -  VisM: - |
| Grau et al., 201610 | FEP  <6 months from initial contact with medical services, < 1 year from the onset of reported symptoms.  N=90  Age: 20.62 (6.92)  Male: 52 (57.8%) | *Attention*: CPT  *EF*: TMT A & B  *IQ*: WAIS  *verbal memory*: Verbal Learning Test España-Complutense (TAVEC)  *WM*: Verbal Learning Test España-Complutense (TAVEC) | DAS | A: -  EF: +  IQ: -  VeM: +  WM: + |
| Horan et al., 201211 | FEP non-affective  DSM-IV  First episode within 2 years  N=55  Age=22.3 (4.3)  Male=42 (76.36%) | *Social cognition:*  *Emotion processing*: Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT)  *Social perception*: TASIT Part III: Social Inference—Enriched, Relationships Across Domains (RAD) | RFS | Social cognition: + |
| Leeson et al., 200912 | FEP non-affective  DSM-IV  <12 weeks antipsychotic treatment  N=54  Male: 43 (79.63%) | *EF:* Stockings of Cambridge  *IQ:* WAIS-R  *Premorbid IQ:* NART  *PS:* stockings of Cambridge  *Visual Memory*: pattern recognition memory (CANTAB)  *WM*: spatial WM, spatial span (CANTAB) | SFS | IQ: + |
| Malla et al., 200213 | FEP non-affective  DSM-IV  <1 month antipsychotic treatment  N=66  Age: 25.6 (8.9)  Male: 49 (74%) | *Attention:* CPT  *EF*: WCST  *Premorbid IQ:* NART  *PS:* Processing Speed Index (WAIS-III)  *Verbal, performance and FSIQ*: WAIS-III  *Verbal fluency*: C & S totals Thurstone Word Fluency Test  *verbal memory*: auditory memory (WMS-III)  *visual memory*: visual memory (WMS-III)  *WM*: Working memory index (WMS-III), Serial Addition Task-PASAT | WQOLI | A: +  EF: -  IQ: +  PMIQ: +  PS: -  VeM: -  VF: +  VisM: +  WM: + |
| Mazza et al., 201214 | FEP  DSM-IV  <3 months from initial diagnosis  N=49  Age: 26.8 (6.4)  Male: 33 (67.35%) | *EF:* TMT-B, Tower of London, verbal fluency  *IQ*: raven progressive matrices  *PS:* TMT-A  *Social cognition*: false belief and advanced theory of mind task  *Verbal memory*: RAVLT  *WM*: digit span  \*cognitive variables only compared to social cognition | VADO Personal and Social Functioning Scale (modified SOFAS) | ToM: + |
| Ohmuro et al., 201615 | FEP  CAARMS-J criteria  N=40  Age: 22.9 (6.3)  Male: 11 (27.5%) | *Cognition:* brief assessment of cognition in schizophrenia (BACS)  *Premorbid IQ:* NART  *Social cognition:*  *ToM:* Theory of mind picture stories task  \*cognitive variables not analysed | GAF | ToM: + |
| Pena et al., 201216 | FEP  DSM-IV  N=95  Age: 28.4 (7. 4)  Male: 77 (81.05%) | *Attention*: Brief Test of Attention, Letters and Numbers  *executive functioning*: WCST  *processing speed:* Digit Symbol, STROOP, TMT A  *verbal fluency:* verbal fluency test  *verbal memory:* LM WMS-IIII; short-term and long-term recall,  *visual memory:* RCFT  *working memory*: LNS and Backward Digits subscales (WAIS) | DAS, GAF | A: -  EF: -  PS: +  VeM: -  VF: -  VisM: +  WM: - |
| Rodriguez et al., 201517 | FES  ICD-10  First admission to MHS  N=36, HC N=36  Age: 26.3 (5.6)  Male: 22 (61.11%) | *Attention:* PEBL Perceptual Vigilance Task  *EF:* TMT B, key search test  *PS:* TMT A  *Verbal memory:* Rey auditory verbal learning test (RAVLT)  *Verbal fluency:* verbal fluency test  *Visual memory:* RCFT  *Verbal WM:* digit span  *Visual WM:* spatial span | GAF, WHOQOL-BREF | A: -  EF: -  PS: -  VeM: +  VF: +  VisM: -  WM: +  VisWM: - |
| Stirling et al., 200318 | FEP  DSM-IV  First episode within 2 years  N=49  Age: 26  Male: 28 (57.14%) | *EF:* WCST  *Premorbid IQ*: NART  *Verbal memory:* Warrington recognition memory tests for faces and words  *visual memory:* Warrington recognition memory tests for faces and words, the memory for design test  *Visuospatial ability/ Perceptual organisation*: object assembly (OA), picture completion (PC) and arrangement (PA) and block design (BD) (WAIS) | WHO life charts, GAF  Composite scores: outcome 1 (work performance, social competence, time trends change and GAF disability) | EF: +  PMIQ: -  VeM: -  VisM: -  Visuospatial ability: + |
| Stouten et al., 201419 | FEP non-affective  DSM-IV  First contact with MHS  N=153  Age: 27.8  Male: 111 (72.55%) | *Attention:* CPT  *General cognition:* info and calculations (WAIS-III)  *Problem solving:* Block Design; Tower of London  *PS:* digit symbol coding, TMT A  *verbal fluency:* Category Fluency, Animal Naming  *Verbal memory:* RAVLT  *Visual memory:* Brief visuospatial memory test – revised (BVMT-R)  *WM*: LNS  *Social cognition:*  *emotion perception:* Amsterdam Neuropsychological Tasks  *social cognitive biases:* Davos Assessment of Cognitive Biases Scale  *social knowledge:* WAIS III Picture Arrangement  *ToM:* Hinting task | PSP | A: -  General cognition: +  Problem solving: -  PS: -  Social knowledge: -  Social cognitive bias: -  ToM: +  VeM: -  VF: -  VisM: +  WM: - |
| Stouten et al., 201720 | FEP non-affective  DSM-IV  <3 months after contact with MHS  N=162  Age: 27.61 (6.3)  Male: 116 (71.6%) | *Attention:* CPT  *General cognition*: WAIS-III Info & calculations  *Problem solving:* WAIS-III BD, Tower of london  *PS:* WAIS-III digit symbol coding, TMT-A  *Verbal fluency*: Category fluency, animal naming  *Verbal memory*: RAVLT  *Visual memory*: BVMT-R  *WM*: LNS WAIS-III  *Social cognition:*  *Emotion perception*: Amsterdam Neuropsychological  Tasks  *Social cog bias*: Davos Assessment of Cognitive  Biases Scale  *Social knowledge*: WAIS picture arrangement | PSP | A: -  PS: +  Problem solving: -  VF: -  VeM: -  VisM: -  General cognition: +  Social cognition: + |
| Van Winkel et al., 200721 | FEP non-affective  DSM-IV  N=51  Age: 23.2 (4)  Male: 70% | *IQ:* (WAIS)  *Premorbid IQ*: Vragenlijst voor Intellectuele Status (VIS) | WHO lifechart | IQ: + |
| Ventura et al., 201522 | FEP non-affective  DSM-IV  <2 years since FEP  N=77  Age: 21.52 (3.75)  Male: 37 (77%) | MATRICS Consensus Cognitive Battery (MCCB) cognitive composite score:  *Attention*  *PS*  *Reasoning/problem solving*  *Verbal memory*  *Visual memory*  *working memory*  *Social cognition:*  *ToM:* Social animations task (SAT)  \*MCCB cognitive composite only compared to ToM | RFS | ToM: + |
| Vesterager et al., 201223 | FEP non-affective  N=117  Age: 25.0(3.3)  Male: 63 (53.8%) | *Attention*: CPT  *EF:* Neuropsychological Assessment Battery (NAB) Mazes  *PS:* TMT A, BACS symbol coding, Category Fluency (Animal Naming)  *Verbal memory*: Hopkin's Verbal Learning Test  *Visual memory*: BVMT-R  *WM*: Spatial Span (WMS-III), LNS (University of Maryland)  *Social cognition*: MSCEIT | UPSA  GAF | A: -  EF: -  PS: -  Social cognition: +  VeM: -  VisM: -  WM: + |
| Wannan et al., 201824 | FEP non-affective  DSM-III  >6 months neuroleptic treatment  N=38  Age: 28.67 (3.96)  Male: 67 (70.53%) | *Premorbid IQ:* NART  *Verbal memory*: verbal paired associates (CANTAB)  *Visual memory*: paired associate learning (CANTAB), Pattern Recognition (CANTAB) | SOFAS | VeM: +  VisM: + |
| Williams et al., 200825 | FES  DSM-IV  First contact with services  N=56  Age: 19.76 (3.2)  Male: 34 (60.71%) | IntegNeuro battery:  *Attention*  *EF*  *PS*  *Social cognition*  *Verbal memory*  *Visual memory*  *Working memory* | SOFAS, WHO QOL | A: +  PS: +  WM: +  VeM: +  EF: +  Social cognition: + |
| Woolverton et al., 201626 | FEP  DSM-IV  < 5 years since the onset of psychotic symptoms  N=71  Age: 23.09 (4.22)  Male: 76.05% | *Social cognition*:  *Attributional style*: Internal, Personal and Situational Attributions Questionnaire (IPSAQ)  *Emotion recognition*: FEIT, FEDT  *Social cue recognition*: situational feature recognition, social cue recognition task (SCRT)  *ToM:* Hinting task | SFS | Social cognition: + |
| Wright et al., 201927 | FEP non-affective  ICD-10  Enrolled in EIS for at least 3 months  N=26  Age: 28.93 (5.55)  Male: 23 (88.46%) | *EF:* TMT, verbal fluency  *General cognition:* Composite score  *Metacognition:* MAI  *Verbal memory:* LM WMS-III  *Verbal & performance IQ:* vocabulary & matrix reasoning (WMS-R)  *WM:* LNS (WMS-III)  *\**Confirmatory Factor Analysis (CFA) neurocognitive factor score | TUS, UPSA | General cognition: +  Metacognition: + |
| Wright et al., 202028 | FEP non-affective  ICD-10  Enrolled in EIS for at least 3 months  N=52  Age: 26.13 (5.5)  Male: 42 (81%) | *IQ*: vocabulary and matrix reasoning (WAIS-II)  *Metacognition*: MAI | TUS, UPSA | IQ: +  Metacognition: + |

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| Longitudinal (< 1 year) cognitive predictors of psychosocial functioning | | | | | | | | | |
| Author | **Sample characteristicsa** | | | **Cognitive measures** | | | **Functional measuresb** | | **Main Findingsc** | |
| Allot et al., 201329 | | FEP  DSM-IV  N=135  Age: 20.3 (2.4)  Male: 91 (67.4%) | *EF:* TMT A & B  *Premorbid IQ*: The Wide Range Achievement Test-Fourth Edition (WRAT-4)  *PS*: Symbol Digit Modalities Test (SDMT)  *Verbal fluency*: COWAT, animal fluency test  *verbal learning*: Similarities (WAIS-III)  *Verbal memory*: RAVLT  *Visual memory*: RCFT  *WM:* Digit Span, LNS (WAIS-III)  *Social cognition*:  *Emotion recognition*:  Diagnostic Analysis of Nonverbal Accuracy-2-  Adult Version  *ToM*: Picture Sequencing Task (PST), False Belief and Deception Stories Task (FBDST), Hinting Task | | (i) enrolment in education over 6 months (yes/no), (ii) competitive employment attainment over 6 months (yes/no), (iii) hours of competitive employment over 6 months. | 6 months | | EF: -  PMIQ: -  PS: -  Social cognition: -  VeM: -  VF: -  VisM: +  WM: - | |
| Dickerson et al., 200830 | | FEP  DSM-IV  N=71  Age: 25.4 (7.03)  Male: 40 (56%) | Repeatable Battery for the Assessment of Neuropsychological Status (RBANS):  *Attention*  *Language*  *Verbal memory*  *Visuospatial memory*  *EF:* WCST  *General cognition:* Wide Range Achievement Test (WRAT) | | Modified Vocational Index | 6 months | | A: -  EF: +  General cognition: -  VeM: - | |
| Nuechterlein et al., 201131 | | FEP non-affective  DSM-IV  <2 years since FEP  N=35  Age: 24.9 (5.3)  Male: 34 (72.34%) | *Attention:* CPT  *EF:* TMT B  *Processing speed:* Span, TMT A  *Verbal memory:* CVLT  *WM:* digit-span distractibility task | | Return to school/work (dichotomous variable) | 9 months | | A: +  EF: +  PS: +  VeM: +  WM: + | |
| Torgalsboen et al., 201432 | | FEP non-affective  DSM-IV  Within 5 months of first contact with services  N=28  Age: 21 (2.6)  Male: 17 (60.7%) | MCCB:  *Attention*  *General cognition*  *Problem solving*  *PS*  *Social cognition*  *Verbal memory*  *Visual memory*  *Working Memory* | | GAF | 6 months | | A: +  Problem solving: -  PS: -  Social cognition: -  VeM: -  VisM: -  WM: + | |
| Ventura et al., 201522 | | FEP non-affective  DSM-IV  <2 years since FEP  N=77  Age: 21.52 (3.75)  Male: 37 (77%) | MCCB:  *Attention*  *General cognition*  *Problem solving*  *PS*  *Social cognition:*  *ToM:* social animations task (SAT)  *Verbal memory*  *Visual memory*  *Working Memory* | | RFS | 6 months | | ToM: + | |
| Vesterager et al., 201223 | | FEP non-affective  N=117  Age: 25.0(3.3)  Male: 63 (53.8%) | *Attention*: CPT  *EF*: NAB Mazes  *PS*: TMT A, BACS symbol coding, Category Fluency (Animal Naming)  *Social cognition*: MSCEIT  *Verbal memory*: Hopkin's Verbal Learning Test  *Visual memory*: BVMT-R  *WM*: Spatial Span (WMS-III), LNS (University of Maryland) | | UPSA, GAF | 10 months | | A: -  EF: -  PS: -  Social cognition: -  VeM: +  VisM: +  WM: + | |

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| Longitudinal (> 1 year) cognitive predictors of psychosocial function | | | | | | | | | |
| Author | | **Sample characteristicsa** | | **Cognitive measures** | | | **Functional measuresb** | | **Main Findingsc** | |
| Addington et al., 20052 | FEP non-affective  DSM-IV  <3 months treatment  N=247  Age: 24.5 (8.2)  Male: 168 (68.02%) | | *attention*: CPT  *EF*: TMT A & B  *information processing* :Span of apprehension (SPAN)  *PS:* Stroop  *Verbal fluency*: COWAT, category fluency (category instances)  *verbal memory*: LM (WMS-R), RAVLT  *visual memory*: RCFT  *working memory*: Letter-Number Span, WCST | | QLS | 1 year | | A: -  EF: +  PS: +  VeM: +  VF: -  VisM: -  WM: - | |
| Addington et al., 2006a3 | FEP non-affective  DSM-IV  <3 months treatment  N=50  Age: 25.1 (8)  Male: 30 (60%) | | *Attention:* CPT  *PS:* SPAN, TMT A&B, STROOP  *Verbal fluency*: COWAT, category fluency  *Verbal memory*: LM WMS-R, RAVLT  *Visual memory*: RCFT  *WM:* Letter number span, WCST  *Social cognition:*  FEIT, FEDT  \*PCA Factor analysis cognitive score | | QLS | 1 year | | General cognition: +  Social cognition: + | |
| Addington et al., 2006b4 | FEP non-affective  DSM-IV  <3 months treatment  N=50  Age: 25.1 (8.0)  Male: 30 (60%) | | *Attention:* CPT  *PS:* SPAN, TMT A&B, STROOP  *Verbal fluency*: COWAT, category fluency  *Verbal memory*: LM (WMS-R), RAVLT  *Visual memory*: RCFT  *WM:* Letter number span, WCST  Social cognition:  *Social knowledge*: Situational Features Recognition Test  *Social perception*: Social Cue Recognition Test  \*PCA factor analysis cognitive score | | QLS | 1 year | | General cognition: +  Social cognition: + | |
| Ayesa-Arriola et al., 201333 | FEP non-affective  DSM-IV  <6 weeks antipsychotic treatment  N=114  Age: 27.47 (7.6)  Male: 60% | | *Attention:* CPT  *EF:* TMT A & B  *Global cognitive function score*  *Premorbid IQ:* vocabulary (WAIS-III)  *PS*: Digit symbol (WAIS-III)  *Verbal memory*: RAVLT  *Visual memory*: RCFT  *WM*: Backward Digits scale (WAIS-III) | | DAS | 1 year | | A: -  EF: -  PMIQ: -  PS: +  VeM: -  VisM: -  WM: - | |
| Bilder et al., 200034 | FES  RDC criteria  <12 weeks antipsychotic treatment  Age: 25.7 (6.3)  Male: 58.5% | | Battery of assessments:  *Attention*  *EF*  *IQ*  *General cognition*  *Language*  *Memory*  *Premorbid IQ*  *visuospatial skills* | | Global Assessment Scale | 1-2 Years | | A: +  EF: +  General cognition: +  Memory: +  PMIQ: -  Visuospatial ability: + | |
| Boden et al., 201435 | FEP non-affective  First year of illness  N=46  Age: 27 (8)  Male: 29 (63%) | | *General cognition*: Synonyms, Reasoning, and Block Design (SRB – Dureman- Salde battery)  *PS:* TMT and finger tapping  *verbal learning*: Claeson – Dahl Verbal Learning Test | | SCFS | 5 years | | General cognition: -  PS: +  Verbal learning: - | |
| Calvo et al., 201836 | FES  DSM-IV  antipsychotic naïve  N=264  Age: 29.9 (9.93)  male: 57.89% | | *Attention:* CPT  *EF:* TMT A & B  *Premorbid IQ*: Vocabulary (WAIS III)  *PS:* Digit symbol (WAIS III)  *Verbal memory*: RAVLT  *Visual memory*: RCFT  *WM*: Backward Digits Scale (WAIS III) | | DAS | 3 years | | A: -  EF: +  PMIQ: -  PS: +  VeM: -  VisM: -  WM: - | |
| Carlsson et al., 200637 | FEP  DSM-IV  N=120  Age: 26.8(5.5)  Male: 55% | | *IQ:* WAIS-R | | GAF | 3 year | | IQ: + | |
| Chang et al., 201638 | FEP non-affective  DSM-IV  N=114  Age: 26.8 (10.1)  Male: 55.3% | | *\*Composite score:*  *EF:* Modified Wisconsin Card Sorting Test  *PS:* digit-symbol coding  *Verbal fluency*: verbal category fluency  *Verbal memory*: LM (WMS-R)  *Visual memory*: Visual reproduction test (WMS-R)  *WM*: LNS (WMS-R) | | DAS | 1 year | | General cognition: + | |
| Faber et al., 201139 | FEP non-affective  Treatment naïve  DSM-IV  N=45  Age: 25.8 (6.7)  Male: 37 (82.2%) | | *Attention:* CPT, STROOP  *EF:* TMT A & B  *PS:* symbol substitution, verbal fluency  *Verbal memory*: CVLT  *WM*: digit span (WAIS-III) | | GSDS | 2 year | | A: -  EF: -  PS: +  VeM: -  VF: +  WM: - | |
| Faerden et al., 20138 | FEP  DSM-IV  <1 year following the start of initial treatment  N=64  Age: 27.9 (8.4)  Male: 36 (56%) | | *Attention:* digit span forward  *EF:* Verbal fluency, Category fluency, Set shifting, Inhibition  *IQ:* WASI full scale IQ  *Premorbid IQ:* NART  *PS:* digit symbol  *Verbal memory:* CVLT-II  *Visual memory:* RCFT  *WM:* Letter number span forward (WAIS-III) | | GAF | 1 year | | A: -  EF: -  IQ: -  PS: -  VeM: +  VisM: -  WM: - | |
| Fu et al., 201740 | FEP  DSM-IV  Within 5 months of first contact with services  N=22  Age: 21 (2.6)  Male: 17 (60.7%) | | *Attention:* CPT-IP  *Problem solving*: Reasoning and Problem Solving (NAB)  *PS:* TMT A, Symbol Coding (BACS), Category Fluency  *Social Cognition*: MSCEIT  *Verbal memory*: The revised Hopkins Verbal Learning Test (HVLT-R)  *Visual memory*: BVMT-R  *WM*: Spatial Span (WMS), LNS (University of Maryland) | | GAF | 4 years | | A: +  Problem solving: +  PS: -  Social cognition: -  VeM: +  VisM: -  WM: + | |
| Fujii & Wylie 200241 | FEP non-affective  DSM-IV  N=26  Age: 23.6 (5.4)  Male: 25(96.15%) | | *EF:* Halstead Categories, TMT-B  *FSIQ:* WAIS/WAIS-R  *psychomotor functioning*: Finger Tapping  *verbal memory*: LM (WMS-I)  *WM*: Digit span (WMS-I) | | RAFLS | 15 years | | EF: -  IQ: -  VeM: +  WM: - | |
| Gonzalez-Blanch et al., 201042 | FES  DSM-IV  N=92  Age: 25.7 (6.43)  Male: 81 (61.83%) | | *Attention*: CPT, Brief Test of Attention  *EF*: TMT A & B, digit span backward  *PS*: Digit Symbol-Coding  *Verbal memory*: RAVLT | | DAS | 1 year | | A: +  EF: -  PS: -  VeM: - | |
| Gonzalez-Ortega et al., 201343 | FEP  DSM-IV  <6 months DUP  N=26  Age: 25.77 (7.46)  Male: 15 (57.7%) | | *Abstract reasoning:* Similarities (WAIS-III)  *Attention:* TMT A, STROOP, Digit span forward  *EF:* WCST, STROOP, TMT B  *premorbid IQ*: vocabulary (WAIS-III)  *PS*: digit symbol coding  *Verbal fluency*: COWAT  *Verbal memory*: LM, verbal paired associates (WMS-III)  *WM*: LNS, Digit span backward (WAIS-III) | | FAST | 5 year | | A: -  EF: -  PMIQ: -  PS: -  VeM: -  VF: -  WM: + | |
| Holthausen et al., 200744 | FEP  DSM-IV  N=103  Age: 23.8 (6.4)  Male: 77 (74.76%) | | *Attention:* CPT, STROOP  *IQ:* WAIS mean score of 4 subtests  *PS*: STROOP, TMT A & B  *Verbal fluency:* category fluency test  *Verbal memory*: CVLT | | Camberwell Assessment of Needs | 2 years | | A: +  IQ: -  PS: +  VeM: -  VF: - | |
| Horan et al., 201211 | FEP non-affective  DSM-IV  First episode within 2 years  N=55  Age=22.3 (4.3)  Male=42 (76.36%) | | *Social cognition:*  *Emotion processing*: MSCEIT  *Social perception*: TASIT Part III: Social Inference—Enriched, Relationships Across Domains (RAD) | | RFS | 1 year, CS | | Social cognition: + | |
| Jarbin et al., 200345 | FEP  DSM-IV  N=81  Age: 26.7 (20.5-32.6)  Male: 41 (50.62%) | | IQ | | GAF | 10.5 years | | IQ: + | |
| Keshavan et al., 200346 | FEP  DSM-IV  <2 weeks lifetime antipsychotic treatment  N=93  Age: 25.64 (8.2)  Male: 64 (61.54%) | | *EF*: WCST  *PS*: TMT A & B  *VeM*: CVLT  *VisM*: design reproduction (WMS-R)  *WM:* Digit Span (WAIS-R) | | GAF, SCFS | 1 year | | EF: +  PS: +  VeM: -  VisM: +  WM: - | |
| Leeson et al., 200912 | FEP non-affective  DSM-IV  <12 weeks antipsychotic treatment  N=54  Male: 43 (79.63%) | | *EF:* Stockings of Cambridge  *IQ:* WAIS-R  *Premorbid IQ:* NART  *PS:* Stockings of Cambridge  *Visual Memory*: pattern recognition memory (CANTAB)  *WM*: spatial WM, spatial span (CANTAB) | | SFS | 4 years | | EF: -  IQ: +  PMIQ: -  PS: +  VisM: -  WM: - | |
| Lucas et al., 200847 | FEP  DSM-IV  Within 3 months of first contact with services  N=52  Age: 18.7 (2.9)  Male: 33 (64%) | | *Attention:* CPT  *EF:* TMT A & B, WCST  *Processing speed*: Processing Speed Index (WAIS)  *Verbal fluency*: COWAT  *Verbal learning*: Verbal Comprehension Index (WAIS)  *Visual learning*: Perceptual Organisation Index (WAIS)  *Verbal memory*: RAVLT, LM (WMS)  *Visual memory*: RCFT  *Working memory:* Working Memory Index (WAIS/WMS) | | RFS | 3 years | | A: -  EF: -  PS: -  VeM: -  VF: -  VisM: -  Visual learning: +  WM: - | |
| Malla et al., 200213 | FEP non-affective  DSM-IV  <1-month antipsychotic treatment  N=66  Age: 25.6 (8.9)  Male: 49 (74%) | | *Attention:* CPT  *EF*: WCST  *Premorbid IQ:* NART  *PS:* Processing Speed Index (WAIS-III)  *Verbal, performance and FSIQ*: WAIS-III  *Verbal fluency*: C & S totals Thurstone Word Fluency Test  *verbal memory*: auditory memory (WMS-III)  *visual memory*: visual memory (WMS-III)  *WM*: Working memory index (WMS-III), Serial Addition Task-PASAT | | WQOLI | 1 year | | A: +  EF: -  IQ: -  PMIQ: +  PS: -  VeM: -  VF: +  VisM: -  WM: + | |
| Marino et al., 201548 | FEP  DSM-IV  <2 years since FEP  N=65  Age: 22.2 (4.2)  Male: 41 (63.08%) | | MCCB:  *EF*: TMT  *PS:* BACS symbol coding  *Social cognition*: MSCEIT  *VF:* Category fluency  *WM*: Letter number span, NAB mazes | | GAF | 2 years | | EF: -  PS: +  Social cognition: -  VF: -  WM: - | |
| Milev et al., 200549 | FEP non-affective  DSM-IV  N=99  Age: 24 (5)  Male: 69 (69.70%) | | *Attention*: TMT-B, digit span, STROOP  *EF:* WCST  *Problem solving*: Comprehension, similarities, picture completion, picture arrangement (WAIS-R)  *PS:* cancellation task, TMT A, digit symbol (WAIS-R)  *Verbal fluency:* COWAT, vocabulary (WAIS-R)  *Verbal memory*: RAVLT, logical memory (WMS-R)  *Visual memory*: RCFT  *Visuospatial skills:* Block design, object assembly (WAIS-R) | | global psychosocial functioning, relationship impairment, participation and enjoyment of recreational activities, and work impairment. These measures were derived from the most recently administered follow-up Psychiatric Status You Currently Have instrument | 7 years | | A: +  EF: -  PS: -  Problem solving: -  VeM: +  VF: -  VisM: -  Visuospatial ability: - | |
| O’ Connor et al., 201350 | FEP  DSM-IV  First presentation to services  N=127  Age: 29.75 (8.95)  Male: 88 (69%) | | *EF*: TMT-B  *Cognitive insight:* BCIS  *IQ:* Information, Digit Span, Block Design, Matrix Reasoning, Digit Symbol Coding (WAIS-III)  *Verbal memory*: LM (WMS-III)  *Visual memory*: visual memory (WMS-III)  *WM*: Spatial working memory (CANTAB) | | GAF | 1 year | | EF: -  IQ: -  PS: +  VeM: -  VF: +  VisM: -  WM: - | |
| Pena et al., 201216 | FEP  DSM-IV  N=95  Age: 28.4 (7. 4)  Male: 77 (81.05%) | | *Attention*: Brief Test of Attention, Letters and Numbers  *executive functioning*: WCST  *processing speed:* Digit Symbol, STROOP, TMT-A  *verbal fluency:* verbal fluency test  *verbal memory:* LM (WMS-III)  *visual memory:* RCFT  *working memory*: LNS, Backward Digits (WAIS) | | DAS,GAF | 2 years | | A: -  EF: -  PS: +  VeM: -  VF: -  VisM: +  WM: - | |
| Robinson et al., 200451 | FEP non-affective  RDC  <12 weeks treatment  N=94  Age: 25.5 (6.6)  Male: 61 (52%) | | Battery of assessments:  *Attention*  *EF*  *IQ*  *General cognition*  *Language*  *Memory*  *Premorbid IQ*  *visuospatial skills* | | SAS-II | 5 years | | A: +  EF: +  General cognition: +  Memory: +  VF: +  Visuospatial function: + | |
| Sawada et al., 201752 | FEP  DSM-IV  <16 weeks antipsychotic treatment/ onset of psychotic sx within past 60 months  N=29  Age: 23.2 (6.1)  Male: 17 (58.62%) | | Brief Assessment of Cognition in Schizophrenia Japanese  version (BACS-J):  *Motor Speed:* token motor task  *verbal fluency*: category fluency/letter fluency  *Verbal Memory:* list learning  *WM*: digit sequencing | | GAF | 1 year | | A: -  EF: +  VeM: -  VF: -  WM: - | |
| Stouten et al., 201419 | FEP non-affective  DSM-IV  First contact with services  N=153  Age: 27.8  Male: 111 (72.55%) | | *Attention:* CPT  *General cognition:* info and calculations (WAIS-III)  *Problem solving:* Block Design, Tower of London  *PS:* digit symbol coding, TMT-A  *verbal fluency:* Category Fluency, Animal Naming  *Verbal memory:* RAVLT  *Visual memory:* BVMTR  *WM*: LNS  *Social cognition:*  *emotion perception:* Amsterdam Neuropsychological Tasks  *social cognitive biases:* Davos Assessment of Cognitive Biases Scale  *social knowledge:* Picture Arrangement (WAIS-III)  *ToM:* Hinting task | | PSP | 1 year | | A: -  PS: -  Problem solving: -  ToM: +  VeM: -  VF: -  VisM: +  WM: - | |
| Sullivan et al., 201453 | FEP  DSM-IV  First time entering secondary care  N=54  Age: 26.5 (8.3)  Male: 31 (56.9%) | | *EF:* TMT A & B  *Premorbid IQ:* NART  *Verbal memory:* LM (WMS)  *Social cognition:*  *ToM:* Hinting task, visual cartoons test  \*cognitive variables not analysed | | SOFAS | 1 year | | Social cognition: - | |
| Tandberg et al., 201154 | FEP  DSM-IV  <12 weeks antipsychotic treatment  N=121  Age: 30.5 (9.5)  Male: 69 (57%) | | *Attention*: CPT  *EF:* WCST  *IQ*: Similarities, Block Design, Digit Span (WAIS-R)  *PS:* finger tapping test, TMT A & B  *Verbal fluency*: COWAT  *Verbal memory*: CVLT  *WM*: Digit Span Distractibility Test | | GAF, Lehman Quality of Life Interview | 2 years | | A: +  EF: -  IQ: -  PS: -  VeM: -  VF: -  WM: - | |
| Torgalsboen et al., 201555 | FEP non-affective  DSM-IV  Within 5 months of first contact with services  N=28  Age: 21 (2.6)  Male: 17 (60.7%) | | MCCB:  *Attention*  *General cognition*  *PS*  *Reasoning/Problem Solving*  *Social Cognition*  *Verbal memory*  *Visual memory*  *WM* | | GAF | 2 years | | A: +  PS: -  Problem solving: +  Social cognition: -  VeM: -  VisM: -  WM: - | |
| Van Winkel et al., 200721 | FEP non-affective  DSM-IV  N=51  Age: 23.2 (4)  Male: 36 (70%) | | *Premorbid IQ:* Vragenlijst voor Intellectuele Status (VIS)  *IQ:* WAIS | | WHO lifechart | 10.7 years (6-14) | | PMIQ: +  IQ: - | |
| Verdoux et al., 200256 | FEP  DSM-IV  No previous psychiatric hospitalisation  N=35  Age: 32.1 (10.9)  Male: 20 (57.1%) | | *Executive function*: STROOP, WCST, TMT A & B  *Verbal fluency:*verbal fluency test  *Verbal memory*: Battery of memory efficiency (BEM-84)  *Visual memory:* Battery of memory efficiency (BEM-84) | | Occupational status | 2 years | | EF: +  VeM: -  VF: -  VisM: + | |
| Wannan et al., 201824 | FEP non affective  DSM-III  >6 months neuroleptic treatment  N=38  Age: 28.67 (3.96)  Male: 67 (70.53%) | | *Premorbid IQ:* NART  *Verbal memory*: verbal paired associates (CANTAB)  *Visual memory*: paired associate learning, Pattern Recognition (CANTAB) | | SOFAS | 6 years (5-11 range) | | PMIQ: -  VeM: -  VisM: + | |
| Wright et al., 201927 | FEP non-affective  ICD-10  In EIS for at least 3 months  N=26  Age: 28.93 (5.55)  Male: 23 (88.46%) | | *EF:* TMT, verbal fluency  *General cognition:* Composite score  *Metacognition:* MAI  *Verbal memory*: LM (WMS-III)  *Verbal & performance IQ*: vocabulary, matrix reasoning (WMS-R)  *WM:* verbal memory (WMS-III) | | TUS, UPSA | 3 years | | General cognition: +  Metacognition: + | |
| Yamazawa et al., 200857 | FES  ICD-10  No previous treatment  N=24  Age: 27 (6.6)  Male: 11 (45.83%) | | *Attention:* Letter Cancellation Test  *EF*: TMT  *Verbal fluency*: Letter and Category Word Fluency Test  *WM*: Digit Span | | SFS, GAF | 1 year | | A: +  EF: -  VF: +  WM: + | |
| Note: a: Age: Mean (SD); Male: N (%); b: DAS: Disability Assessment Schedule; FAST: Functioning Assessment Short Test; GAF: Global Assessment of Functioning; GSDS: Gronigen Social Disabilities Schedule; PSP: Personal and Social Performance scale; QLS: Quality of Life Scale; RAFLS: Resource Associated Functional Level Scale; RFS: Role Functioning Scale; SAS-II: Social Adjustment Scale; SCFS: Strauss-Carpenter Functioning Scale; SFS: Social Functioning Scale; SOFAS: Social and Occupational Functioning Assessment Scale; TUS: Time Use Survey; UPSA: UCSD Performance-based Skills Assessment; WHOQOL-BREF: WHO Quality of Life Assessment; WQOLI: Wisconsin Quality of Life Index; c: +: significant association found; -: no significant association found; A: Attention; EF: Executive function; PMIQ: Pre-morbid IQ; PS: Processing speed; ToM: Theory of Mind; VeC: Verbal comprehension; VeM: Verbal memory; VF: Verbal fluency; ViSM: Visual memory; WM: Working memory. | | | | | | | | | |

**Table 2. Methodological quality assessment of studies included in the meta-analysis.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Quality assessment** | | | | | |  |  |  |
| **Study** | **1** | **2** | **3** | **4** | **5** | **6** | **Total** | **Criteria for FEP** | **Medication naive** |
| Achim et al., 2012 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | duration of illness up to 60 months | no |
| Addington et al., 2005 | 1 | 0 | 1 | 1 | 0 | 1 | 4 | <3 months treatment | no |
| Addington et al., 2006a | 1 | 0 | 1 | 1 | 0 | 0 | 3 | <3 months treatment | no |
| Addington et al., 2006b | 1 | 0 | 1 | 1 | 0 | 0 | 3 | <3 months treatment | no |
| Allot et al., 2013 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | NS | no |
| Ayesa Arriola et al., 2013 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | NS | naïve or <6 weeks |
| Bilder et al., 2000 | 0 | 1 | 1 | 1 | 0 | 0 | 3 | NS | <12 weeks |
| Boden et al., 2014 | 1 | 0 | 1 | 1 | 1 | 0 | 4 | first year of illness | no |
| Calvo et al., 2018 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | NS | naïve |
| Carlsson et al., 2006 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | NS | no |
| Chang et al., 2016 | 1 | 0 | 1 | 1 | 1 | 0 | 4 | NS | NS |
| Clayson et al., 2019 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | <2 years from onset of symptoms | no |
| Davies et al., 2017 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | NS | no |
| Dickerson et al., 2008 | 1 | 0 | 0 | 1 | 1 | 0 | 3 | FEP in last 24 months | NS |
| Faber et al., 2011 | 1 | 0 | 1 | 1 | 1 | 0 | 4 | never treated | no |
| Faerden et al., 2013 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | 1 year following start of first treatment | NS |
| Fujii & Wylie., 2002 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | NS | NS |
| Gonzalez blanch et al., 2011 | 1 | 0 | 1 | 1 | 0 | 1 | 4 | NS | naïve |
| Gonzalez-blanch et al., 2010 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | NS | naïve |
| Gonzalez-ortega et al., 2013 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | <6 months DUP | NS |
| Grau et al., 2016 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | <6months from initial contact with services, <1 year from onset of symptoms | NS |
| Horan et al., 2012 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | < 2 years from onset of symptoms | no |
| Jarbin et al., 2003 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | NS | NS |
| Keshavan et al., 2003 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | NS | <2 weeks lifetime antipsychotic medication |
| Leeson et al., 2009 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | assessed at presentation for FEP | <12 weeks |
| Malla et al., 2002 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | NS | <1 month |
| Milev et al., 2005 | 1 | 0 | 0 | 1 | 0 | 1 | 3 | first hospitalisation | no |
| Nuechterlein et al., 2011 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | <2 years | no |
| O Connor et al., 2013 | 1 | 0 | 1 | 1 | 0 | 1 | 4 | first presentation to services, <3 months after first contact to study | no |
| Ohmuro et al., 2016 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | NS | no |
| Pena et al., 2012 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | NS | no |
| Robinson et al., 2004 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | NS | <12 weeks |
| Sawada et al., 2017 | 0 | 0 | 1 | 1 | 1 | 0 | 3 | <60 months since symptom onset | <16 weeks |
| Stouten et al., 2014 | 1 | 0 | 1 | 1 | 0 | 1 | 4 | first presentation, assessment within 3 months | NS |
| Stouten et al., 2017 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | within 3 months after referral | NS |
| Tandberg et al., 2011 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | when referred for FEP | <12 weeks |
| Torgalsboen et al., 2014 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | referral within five months of their first contact with services | no |
| Torgalsboen et al., 2015 | 1 | 0 | 1 | 1 | 0 | 1 | 4 | referral within 5 months of first contact with services | no |
| Van Winkel et al., 2007 | 1 | 0 | 1 | 1 | 1 | 0 | 4 | NS | NS |
| Ventura et al., 2015 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | within 2 years of study entry | no |
| Vesterager et al., 2012 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | NS | no |
| Wannan et al., 2018 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | NS | <6 months |
| Williams et al., 2008 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | first contact with mental health service | no |
| Wright et al., 2019 | 1 | 1 | 1 | 1 | 0 | 1 | 5 | NS | no |
| Wright et al., 2020 | 1 | 0 | 1 | 1 | 1 | 1 | 5 | NS | no |
| Yamazawa et al., 2008 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | treated for first time | naïve |

Quality rating:(1) The clinical sample was representative of the target population (diagnosis based on well-established clinical diagnostic manuals), (2) The authors performed sample size calculations and/or power analysis, (3) The study used well-established measures of psychosocial function, (4) The study used well-established measures of clinical and cognitive variables, (5) The authors provided estimates of variability (standard error, standard deviation or confidence intervals), (6) Collinearity assessed/ corrected for multiple comparisons.

NS – not specified



**Figure 1**. Forest plots of subgroup comparisons for general cognitive ability, processing speed and social cognition.



**Figure 2.** Forest plots of subgroup comparisons for verbal memory, visual memory and working memory.



**Figure 3**. Forest plots of subgroup comparisons for attention, executive function and verbal fluency.

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