

Obsessive Compulsive Disorder: Systematic Review with SAIMSARA.

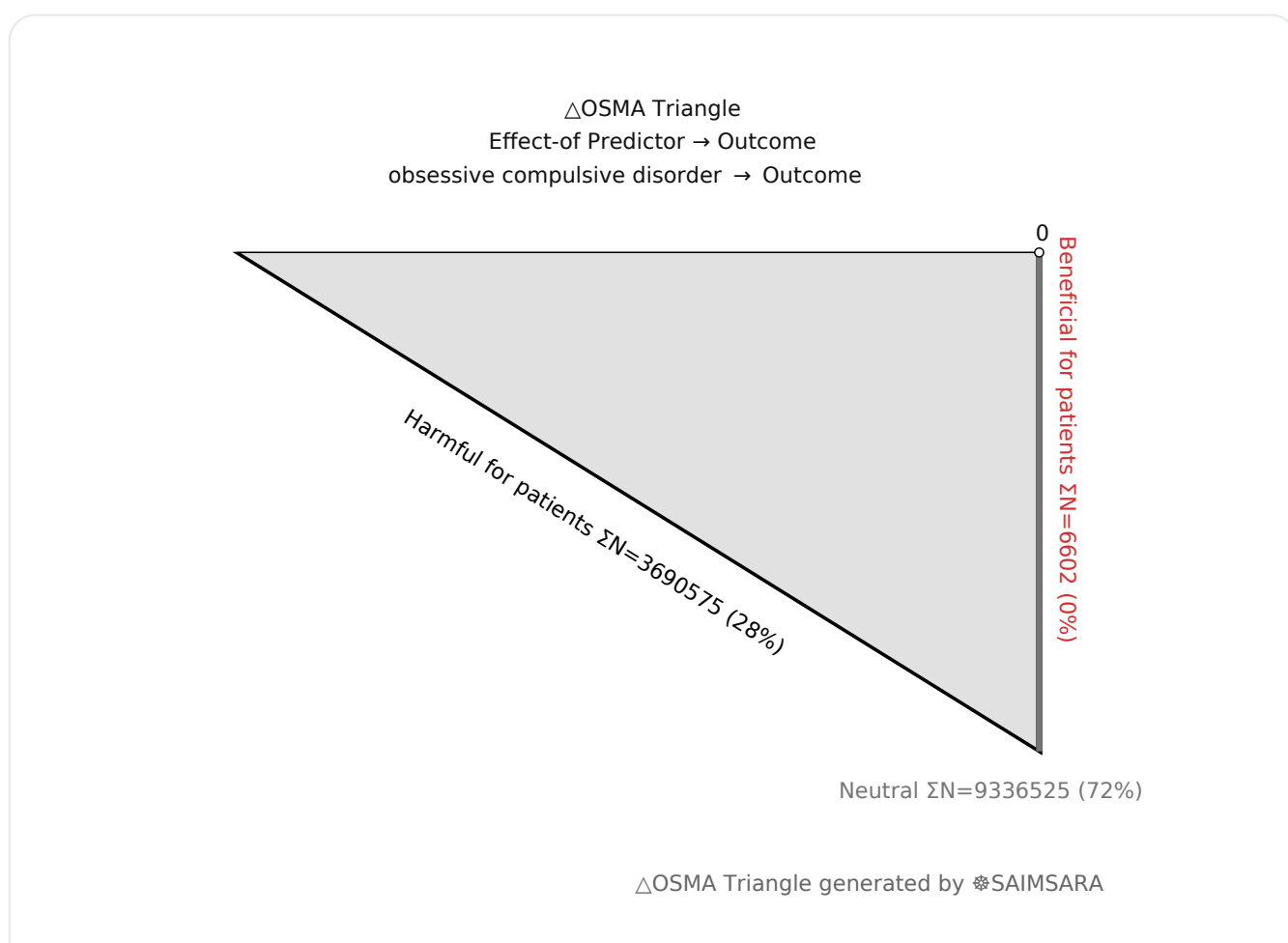
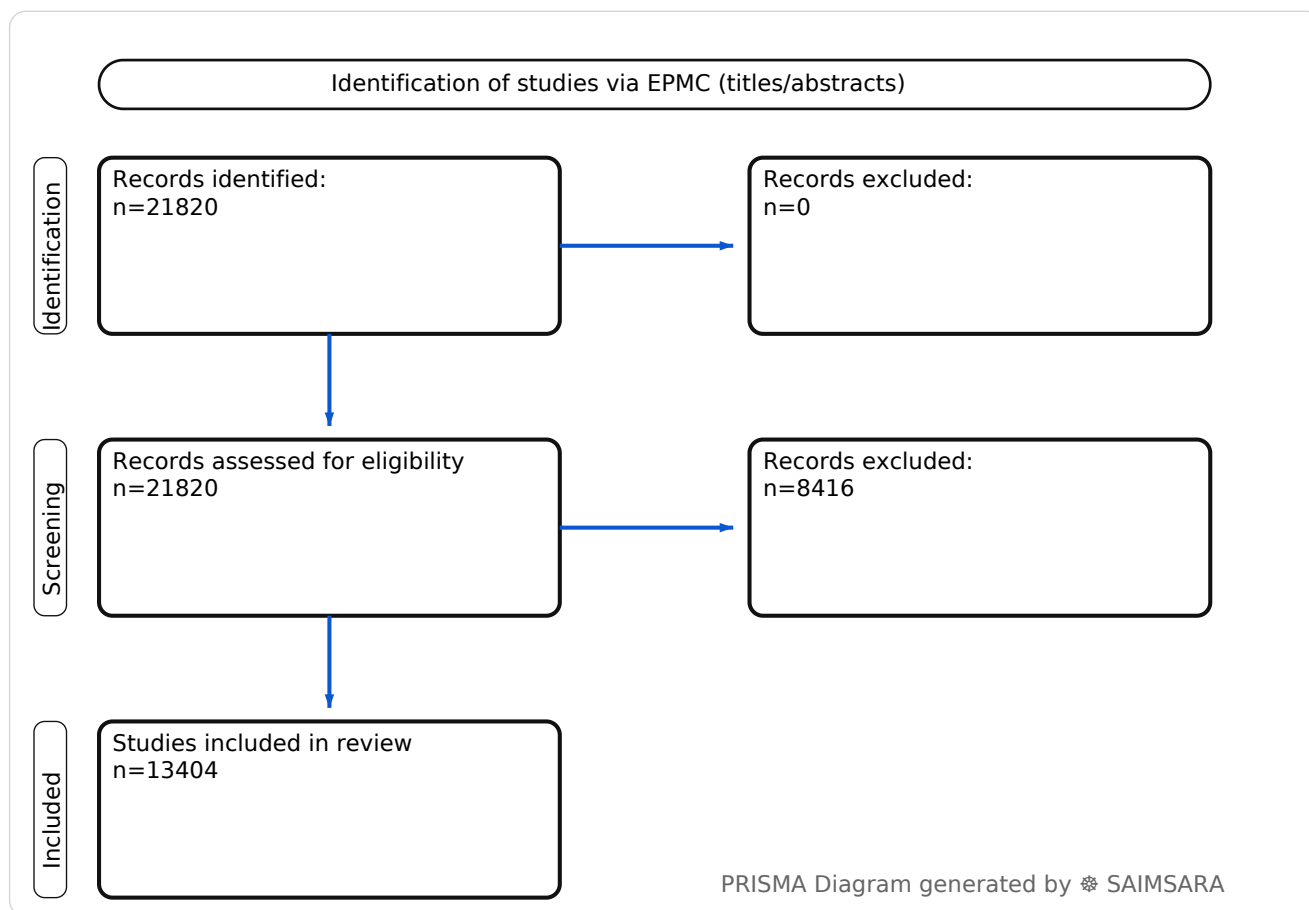
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Abstract: This paper aims to systematically review and synthesize recent academic literature on obsessive-compulsive disorder, identifying key themes in its prevalence, etiology, neurobiology, clinical phenomenology, comorbidities, and therapeutic advancements, to highlight current understanding and future research directions. The review utilises 13404 studies with 13033702 total participants (naïve ΣN). The current research landscape on obsessive-compulsive disorder is rich and diverse, highlighting its complex etiology, varied clinical presentations, and significant comorbidity burden. The median prevalence of OCD across various populations is approximately 9.1%, underscoring its widespread impact. Advances in neurobiology reveal intricate brain network dysfunctions, while therapeutic innovations, from enhanced psychotherapies like ERP and ACT to neuromodulation techniques such as DBS and TMS, offer hope for improved outcomes. However, the field is limited by methodological heterogeneity and a lack of long-term follow-up in many studies. Future research should prioritize longitudinal studies to understand causal mechanisms, validate biomarkers for personalized treatment, and develop culturally sensitive, technology-enhanced interventions to address the global burden of OCD.

Keywords: Obsessive-Compulsive Disorder; Comorbidity; Neuroimaging; Treatment; Compulsive behaviors; Psychotic symptoms; Emotion regulation; Digital health; Child and adolescent; Obsessive-Compulsive Personality Disorder

Review Stats

- Generated: 2026-02-18 01:31:30 CET
- Plan: Pro (expanded craft tokens; source: Europe PMC)
- Source: Europe PMC
- Scope: Titles/Abstracts (tiab)
- Keyword Gate: Fuzzy ($\geq 60\%$ of required terms, minimum 2 terms matched in title/abstract)
- Total Abstracts/Papers: 21820
- Downloaded Abstracts/Papers: 21820
- Included original Abstracts/Papers: 13404
- Total study participants (naïve ΣN): 13033702



Outcome-Sentiment Meta-Analysis (OSMA): (LLM-only)

Frame: Effect-of Predictor → Outcome • *Source:* Europe PMC

Outcome: Outcome Typical timepoints: 12-mo, 1-y. Reported metrics: %, CI, p.

Common endpoints: Common endpoints: functional, qol, complications.

Predictor: obsessive compulsive disorder — exposure/predictor. Doses/units seen: 80 mg, 10 mg, 50 mg, 100 mg, 650 mg, 525 mg.... Routes seen: oral, intravenous, im, iv.... Typical comparator: a waitlist control, control, those with ocd only, those without ocs....

- **1) Beneficial for patients** — Outcome with obsessive compulsive disorder — [281], [692], [851], [1253], [1407], [1951], [2104], [2110], [2111], [2117], [2118], [2125], [2129], [2768], [3123], [4531], [4536], [4540], [4551], [4874], [4922], [5432], [5438], [5453], [5856], [6458], [6462], [6469], [6473], [6475], [7718], [9153], [9154], [9155], [9157], [9158], [9172], [9175], [9177], [9179], [9398], [9421], [10441], [10444], [10448], [10459], [10462], [10464], [10470], [11920], [11932], [11934], [11939], [12614], [12626], [12627] — $\Sigma N=6602$
- **2) Harmful for patients** — Outcome with obsessive compulsive disorder — [32], [33], [37], [40], [41], [43], [44], [45], [46], [49], [52], [54], [55], [139], [141], [167], [169], [172], [180], [212], [213], [214], [215], [217], [221], [224], [226], [227], [228], [231], [232], [234], [235], [236], [238], [239], [241], [243], [250], [251], [265], [269], [276], [280], [288], [292], [299], [301], [303], [305], [310], [311], [313], [314], [319], [320], [321], [322], [323], [329], [330], [333], [340], [343], [392], [402], [404], [405], [407], [408], [409], [481], [483], [484], [485], [486], [487], [488], [489], [490], [492], [494], [495], [496], [497], [498], [499], [500], [501], [502], [503], [504], [505], [506], [507], [508], [509], [510], [511], [513], [514], [515], [517], [518], [522], [524], [525], [526], [529], [530], [531], [532], [535], [536], [537], [538], [540], [546], [547], [560], [570], [573], [632], [637], [641], [646], [647], [649], [656], [658], [662], [713], [747], [753], [754], [756], [759], [760], [763], [773], [776], [798], [804], [809], [811], [812], [815], [816], [817], [818], [820], [821], [822], [823], [824], [825], [826], [827], [828], [829], [830], [831], [832], [834], [836], [837], [839], [840], [847], [854], [861], [903], [906], [908], [916], [922], [924], [929], [930], [933], [950], [981], [1020], [1052], [1064], [1067], [1073], [1104], [1195], [1204], [1206], [1217], [1218], [1228], [1231], [1233], [1240], [1241], [1242], [1243], [1248], [1249], [1252], [1254], [1264], [1267], [1269], [1275], [1280], [1282], [1289], [1292], [1297], [1298], [1299], [1301], [1303], [1304], [1309], [1310], [1313], [1319], [1322], [1327], [1339], [1362], [1379], [1412], [1414], [1424], [1441], [1442], [1446], [1447], [1450], [1451], [1452], [1454], [1467], [1471], [1472], [1491], [1521], [1532], [1538], [1540], [1545], [1546], [1555], [1556], [1558], [1560], [1591], [1618], [1621], [1622], [1636], [1644], [1651], [1682], [1685],

[1688], [1693], [1700], [1704], [1724], [1739], [1750], [1756], [1761], [1762], [1769], [1770], [1807], [1816], [1817], [1822], [1833], [1835], [1837], [1839], [1840], [1842], [1847], [1871], [1873], [1876], [1884], [1889], [1932], [1936], [1937], [1941], [1959], [1982], [1996], [2013], [2019], [2023], [2031], [2032], [2039], [2041], [2042], [2048], [2050], [2055], [2057], [2060], [2088], [2109], [2112], [2114], [2115], [2121], [2124], [2126], [2127], [2130], [2132], [2137], [2150], [2162], [2166], [2167], [2168], [2171], [2173], [2175], [2177], [2179], [2180], [2187], [2191], [2194], [2198], [2199], [2201], [2204], [2205], [2207], [2209], [2210], [2214], [2215], [2216], [2218], [2220], [2229], [2237], [2251], [2271], [2283], [2284], [2286], [2292], [2296], [2303], [2305], [2306], [2311], [2318], [2341], [2349], [2428], [2488], [2498], [2518], [2523], [2528], [2531], [2532], [2536], [2537], [2538], [2543], [2544], [2546], [2547], [2548], [2549], [2550], [2553], [2563], [2573], [2583], [2584], [2585], [2588], [2607], [2613], [2625], [2630], [2635], [2637], [2648], [2649], [2651], [2652], [2653], [2654], [2657], [2662], [2665], [2666], [2668], [2669], [2671], [2672], [2673], [2674], [2676], [2681], [2684], [2692], [2717], [2749], [2759], [2769], [2773], [2774], [2777], [2778], [2779], [2780], [2781], [2782], [2784], [2785], [2786], [2788], [2789], [2797], [2846], [2881], [2911], [2971], [2972], [2973], [2984], [3032], [3034], [3044], [3046], [3047], [3051], [3053], [3091], [3108], [3130], [3152], [3154], [3157], [3161], [3163], [3167], [3168], [3172], [3173], [3181], [3182], [3194], [3198], [3199], [3200], [3211], [3217], [3218], [3219], [3226], [3228], [3229], [3230], [3232], [3233], [3239], [3240], [3242], [3246], [3251], [3254], [3259], [3260], [3264], [3266], [3308], [3322], [3326], [3330], [3366], [3398], [3412], [3416], [3420], [3427], [3436], [3438], [3442], [3443], [3452], [3467], [3482], [3499], [3505], [3542], [3546], [3551], [3552], [3553], [3557], [3562], [3565], [3581], [3582], [3590], [3598], [3601], [3605], [3606], [3608], [3610], [3613], [3616], [3618], [3619], [3621], [3623], [3693], [3708], [3751], [3757], [3763], [3771], [3778], [3810], [3832], [3847], [3878], [3900], [3991], [3992], [3993], [3994], [3995], [3997], [3999], [4001], [4002], [4003], [4005], [4006], [4007], [4008], [4009], [4010], [4011], [4012], [4014], [4015], [4018], [4019], [4020], [4025], [4027], [4041], [4052], [4067], [4081], [4084], [4089], [4107], [4141], [4152], [4176], [4220], [4223], [4224], [4226], [4227], [4228], [4281], [4294], [4304], [4329], [4331], [4335], [4343], [4348], [4354], [4357], [4371], [4372], [4374], [4383], [4386], [4403], [4406], [4461], [4471], [4472], [4479], [4486], [4490], [4491], [4496], [4503], [4514], [4527], [4530], [4532], [4547], [4548], [4553], [4556], [4558], [4559], [4561], [4562], [4564], [4570], [4577], [4580], [4581], [4582], [4583], [4584], [4585], [4588], [4589], [4590], [4621], [4624], [4625], [4627], [4628], [4629], [4632], [4634], [4635], [4636], [4638], [4640], [4641], [4642], [4644], [4646], [4648], [4649], [4650], [4741], [4742], [4744], [4745], [4746], [4753], [4758], [4759], [4760], [4761], [4762], [4768], [4769], [4770], [4774], [4779], [4796], [4797], [4798], [4814], [4831], [4833], [4834], [4836], [4838], [4839], [4841], [4842], [4843], [4845],

[4846], [4848], [4853], [4856], [4859], [4879], [4898], [4900], [4907], [4910], [4974], [5011], [5013], [5014], [5022], [5026], [5027], [5029], [5033], [5035], [5038], [5041], [5045], [5053], [5054], [5055], [5059], [5060], [5061], [5064], [5070], [5077], [5079], [5080], [5082], [5088], [5089], [5093], [5094], [5095], [5096], [5097], [5104], [5115], [5116], [5131], [5135], [5139], [5142], [5144], [5146], [5147], [5154], [5156], [5157], [5158], [5192], [5194], [5196], [5197], [5198], [5199], [5200], [5203], [5207], [5213], [5214], [5215], [5216], [5217], [5246], [5253], [5256], [5260], [5267], [5269], [5274], [5276], [5278], [5282], [5284], [5290], [5303], [5304], [5307], [5308], [5309], [5373], [5377], [5382], [5386], [5389], [5390], [5396], [5400], [5415], [5417], [5424], [5450], [5460], [5471], [5491], [5497], [5498], [5502], [5512], [5519], [5555], [5556], [5568], [5581], [5582], [5583], [5585], [5587], [5588], [5589], [5591], [5592], [5593], [5594], [5596], [5597], [5598], [5599], [5600], [5602], [5603], [5604], [5605], [5606], [5608], [5609], [5610], [5611], [5613], [5637], [5649], [5658], [5660], [5671], [5672], [5676], [5679], [5680], [5684], [5686], [5691], [5693], [5697], [5698], [5699], [5704], [5709], [5710], [5713], [5721], [5725], [5726], [5728], [5730], [5733], [5739], [5746], [5799], [5809], [5858], [5865], [5911], [5914], [5915], [5922], [5923], [5925], [5926], [5927], [5928], [5936], [5939], [5940], [5943], [5956], [6042], [6056], [6064], [6066], [6067], [6068], [6071], [6074], [6078], [6082], [6083], [6084], [6088], [6123], [6128], [6132], [6135], [6156], [6167], [6171], [6175], [6177], [6181], [6195], [6201], [6203], [6207], [6213], [6218], [6227], [6232], [6234], [6236], [6237], [6247], [6258], [6260], [6263], [6264], [6266], [6268], [6269], [6270], [6277], [6297], [6310], [6320], [6375], [6381], [6404], [6406], [6408], [6416], [6420], [6474], [6510], [6511], [6531], [6532], [6557], [6562], [6573], [6600], [6607], [6615], [6647], [6664], [6665], [6685], [6702], [6706], [6720], [6722], [6725], [6726], [6727], [6730], [6733], [6735], [6737], [6738], [6741], [6742], [6743], [6744], [6745], [6747], [6750], [6811], [6817], [6820], [6835], [6836], [6847], [6848], [6855], [6866], [6868], [6924], [6933], [6934], [6951], [6959], [6968], [6969], [6970], [6975], [6983], [7029], [7044], [7059], [7060], [7079], [7087], [7148], [7149], [7151], [7162], [7164], [7170], [7182], [7187], [7190], [7200], [7201], [7202], [7205], [7206], [7209], [7213], [7220], [7223], [7225], [7226], [7228], [7232], [7234], [7236], [7242], [7244], [7248], [7252], [7260], [7264], [7268], [7271], [7274], [7279], [7305], [7338], [7381], [7382], [7387], [7398], [7400], [7403], [7404], [7407], [7415], [7417], [7419], [7430], [7439], [7455], [7508], [7515], [7566], [7577], [7580], [7640], [7689], [7742], [7744], [7745], [7750], [7753], [7757], [7760], [7805], [7815], [7826], [7927], [7951], [7952], [7953], [7954], [7955], [7956], [7957], [7959], [7960], [7962], [7963], [7965], [7966], [7967], [7972], [7974], [7975], [7977], [7979], [7980], [8011], [8012], [8025], [8028], [8033], [8035], [8040], [8044], [8050], [8052], [8056], [8057], [8059], [8060], [8062], [8065], [8069], [8076], [8077], [8088], [8090], [8091], [8101], [8102], [8105], [8110], [8112], [8113], [8115], [8122], [8128], [8136], [8140], [8151],

[8153], [8156], [8159], [8191], [8205], [8253], [8258], [8264], [8271], [8281], [8317], [8327], [8333], [8337], [8374], [8385], [8387], [8390], [8397], [8405], [8410], [8414], [8451], [8464], [8465], [8620], [8621], [8625], [8732], [8762], [8791], [8793], [8794], [8795], [8798], [8805], [8806], [8810], [8812], [8816], [8819], [8820], [8911], [8914], [8917], [8919], [8921], [8922], [8923], [8929], [8933], [9031], [9061], [9083], [9089], [9121], [9123], [9125], [9126], [9128], [9129], [9138], [9141], [9142], [9146], [9148], [9149], [9150], [9192], [9226], [9232], [9325], [9362], [9365], [9366], [9376], [9384], [9442], [9445], [9448], [9449], [9483], [9496], [9506], [9507], [9636], [9637], [9648], [9751], [9752], [9753], [9755], [9756], [9757], [9758], [9759], [9760], [9763], [9764], [9765], [9766], [9767], [9769], [9770], [9771], [9772], [9773], [9774], [9775], [9776], [9777], [9778], [9779], [9780], [9783], [9789], [9794], [9799], [9803], [9810], [9822], [9826], [9901], [9966], [9984], [10035], [10103], [10116], [10141], [10142], [10143], [10144], [10146], [10147], [10148], [10150], [10151], [10152], [10154], [10156], [10160], [10162], [10165], [10168], [10169], [10170], [10293], [10299], [10302], [10303], [10305], [10326], [10333], [10337], [10339], [10341], [10343], [10349], [10356], [10377], [10387], [10396], [10412], [10417], [10418], [10445], [10447], [10455], [10461], [10477], [10489], [10494], [10520], [10567], [10579], [10747], [10759], [10775], [10778], [10781], [10796], [10891], [10893], [10897], [10899], [10903], [10905], [10907], [10913], [10914], [10915], [10916], [10917], [10919], [10920], [10951], [10962], [10970], [11040], [11082], [11087], [11110], [11193], [11207], [11211], [11213], [11216], [11273], [11276], [11321], [11323], [11331], [11348], [11375], [11376], [11397], [11398], [11424], [11425], [11428], [11429], [11434], [11435], [11443], [11444], [11522], [11580], [11587], [11595], [11608], [11609], [11634], [11636], [11637], [11641], [11672], [11685], [11693], [11694], [11732], [11750], [11767], [11821], [11833], [11845], [11847], [11881], [11893], [11894], [11898], [11900], [11917], [11919], [11942], [11944], [11946], [11952], [11953], [11956], [11966], [11967], [12013], [12059], [12078], [12110], [12121], [12169], [12188], [12214], [12226], [12227], [12228], [12230], [12241], [12247], [12250], [12256], [12258], [12260], [12297], [12301], [12304], [12305], [12324], [12332], [12333], [12335], [12342], [12354], [12361], [12375], [12380], [12437], [12467], [12481], [12511], [12528], [12622], [12662], [12664], [12677], [12678], [12690], [12755], [12871], [12873], [12878], [12882], [12883], [12887], [12889], [12891], [12893], [12894], [12897], [12898], [12899], [12903], [12912], [12918], [12930], [12957], [12974], [13066], [13084], [13092], [13263], [13268], [13273], [13282], [13288], [13383], [13395], [13399] — $\Sigma N=3690575$

- **3) No clear effect** — Outcome with obsessive compulsive disorder — [1], [2], [3], [4], [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19], [20], [21], [22], [23], [24], [25], [26], [27], [28], [29], [30], [31], [34], [35], [36], [38], [39], [42],

[47], [48], [50], [51], [53], [56], [57], [58], [59], [60], [61], [62], [63], [64], [65], [66], [67], [68], [69], [70], [71], [72], [73], [74], [75], [76], [77], [78], [79], [80], [81], [82], [83], [84], [85], [86], [87], [88], [89], [90], [91], [92], [93], [94], [95], [96], [97], [98], [99], [100], [101], [102], [103], [104], [105], [106], [107], [108], [109], [110], [111], [112], [113], [114], [115], [116], [117], [118], [119], [120], [121], [122], [123], [124], [125], [126], [127], [128], [129], [130], [131], [132], [133], [134], [135], [136], [137], [138], [140], [142], [143], [144], [145], [146], [147], [148], [149], [150], [151], [152], [153], [154], [155], [156], [157], [158], [159], [160], [161], [162], [163], [164], [165], [166], [168], [170], [171], [173], [174], [175], [176], [177], [178], [179], [181], [182], [183], [184], [185], [186], [187], [188], [189], [190], [191], [192], [193], [194], [195], [196], [197], [198], [199], [200], [201], [202], [203], [204], [205], [206], [207], [208], [209], [210], [211], [216], [218], [219], [220], [222], [223], [225], [229], [230], [233], [237], [240], [242], [244], [245], [246], [247], [248], [249], [252], [253], [254], [255], [256], [257], [258], [259], [260], [261], [262], [263], [264], [266], [267], [268], [270], [271], [272], [273], [274], [275], [277], [278], [279], [282], [283], [284], [285], [286], [287], [289], [290], [291], [293], [294], [295], [296], [297], [298], [300], [302], [304], [306], [307], [308], [309], [312], [315], [316], [317], [318], [324], [325], [326], [327], [328], [331], [332], [334], [335], [336], [337], [338], [339], [341], [342], [344], [345], [346], [347], [348], [349], [350], [351], [352], [353], [354], [355], [356], [357], [358], [359], [360], [361], [362], [363], [364], [365], [366], [367], [368], [369], [370], [371], [372], [373], [374], [375], [376], [377], [378], [379], [380], [381], [382], [383], [384], [385], [386], [387], [388], [389], [390], [391], [393], [394], [395], [396], [397], [398], [399], [400], [401], [403], [406], [410], [411], [412], [413], [414], [415], [416], [417], [418], [419], [420], [421], [422], [423], [424], [425], [426], [427], [428], [429], [430], [431], [432], [433], [434], [435], [436], [437], [438], [439], [440], [441], [442], [443], [444], [445], [446], [447], [448], [449], [450], [451], [452], [453], [454], [455], [456], [457], [458], [459], [460], [461], [462], [463], [464], [465], [466], [467], [468], [469], [470], [471], [472], [473], [474], [475], [476], [477], [478], [479], [480], [482], [491], [493], [512], [516], [519], [520], [521], [523], [527], [528], [533], [534], [539], [541], [542], [543], [544], [545], [548], [549], [550], [551], [552], [553], [554], [555], [556], [557], [558], [559], [561], [562], [563], [564], [565], [566], [567], [568], [569], [571], [572], [574], [575], [576], [577], [578], [579], [580], [581], [582], [583], [584], [585], [586], [587], [588], [589], [590], [591], [592], [593], [594], [595], [596], [597], [598], [599], [600], [601], [602], [603], [604], [605], [606], [607], [608], [609], [610], [611], [612], [613], [614], [615], [616], [617], [618], [619], [620], [621], [622], [623], [624], [625], [626], [627], [628], [629], [630], [631], [633], [634], [635], [636], [638], [639], [640], [642], [643], [644], [645], [648], [650], [651], [652], [653], [654], [655], [657], [659], [660], [661], [663], [664], [665], [666], [667], [668], [669], [670], [671], [672],

[673], [674], [675], [676], [677], [678], [679], [680], [681], [682], [683], [684], [685], [686], [687], [688], [689], [690], [691], [693], [694], [695], [696], [697], [698], [699], [700], [701], [702], [703], [704], [705], [706], [707], [708], [709], [710], [711], [712], [714], [715], [716], [717], [718], [719], [720], [721], [722], [723], [724], [725], [726], [727], [728], [729], [730], [731], [732], [733], [734], [735], [736], [737], [738], [739], [740], [741], [742], [743], [744], [745], [746], [748], [749], [750], [751], [752], [755], [757], [758], [761], [762], [764], [765], [766], [767], [768], [769], [770], [771], [772], [774], [775], [777], [778], [779], [780], [781], [782], [783], [784], [785], [786], [787], [788], [789], [790], [791], [792], [793], [794], [795], [796], [797], [799], [800], [801], [802], [803], [805], [806], [807], [808], [810], [813], [814], [819], [833], [835], [838], [841], [842], [843], [844], [845], [846], [848], [849], [850], [852], [853], [855], [856], [857], [858], [859], [860], [862], [863], [864], [865], [866], [867], [868], [869], [870], [871], [872], [873], [874], [875], [876], [877], [878], [879], [880], [881], [882], [883], [884], [885], [886], [887], [888], [889], [890], [891], [892], [893], [894], [895], [896], [897], [898], [899], [900], [901], [902], [904], [905], [907], [909], [910], [911], [912], [913], [914], [915], [917], [918], [919], [920], [921], [923], [925], [926], [927], [928], [931], [932], [934], [935], [936], [937], [938], [939], [940], [941], [942], [943], [944], [945], [946], [947], [948], [949], [951], [952], [953], [954], [955], [956], [957], [958], [959], [960], [961], [962], [963], [964], [965], [966], [967], [968], [969], [970], [971], [972], [973], [974], [975], [976], [977], [978], [979], [980], [982], [983], [984], [985], [986], [987], [988], [989], [990], [991], [992], [993], [994], [995], [996], [997], [998], [999], [1000], [1001], [1002], [1003], [1004], [1005], [1006], [1007], [1008], [1009], [1010], [1011], [1012], [1013], [1014], [1015], [1016], [1017], [1018], [1019], [1021], [1022], [1023], [1024], [1025], [1026], [1027], [1028], [1029], [1030], [1031], [1032], [1033], [1034], [1035], [1036], [1037], [1038], [1039], [1040], [1041], [1042], [1043], [1044], [1045], [1046], [1047], [1048], [1049], [1050], [1051], [1053], [1054], [1055], [1056], [1057], [1058], [1059], [1060], [1061], [1062], [1063], [1065], [1066], [1068], [1069], [1070], [1071], [1072], [1074], [1075], [1076], [1077], [1078], [1079], [1080], [1081], [1082], [1083], [1084], [1085], [1086], [1087], [1088], [1089], [1090], [1091], [1092], [1093], [1094], [1095], [1096], [1097], [1098], [1099], [1100], [1101], [1102], [1103], [1105], [1106], [1107], [1108], [1109], [1110], [1111], [1112], [1113], [1114], [1115], [1116], [1117], [1118], [1119], [1120], [1121], [1122], [1123], [1124], [1125], [1126], [1127], [1128], [1129], [1130], [1131], [1132], [1133], [1134], [1135], [1136], [1137], [1138], [1139], [1140], [1141], [1142], [1143], [1144], [1145], [1146], [1147], [1148], [1149], [1150], [1151], [1152], [1153], [1154], [1155], [1156], [1157], [1158], [1159], [1160], [1161], [1162], [1163], [1164], [1165], [1166], [1167], [1168], [1169], [1170], [1171], [1172], [1173], [1174], [1175], [1176], [1177], [1178], [1179], [1180], [1181], [1182], [1183], [1184], [1185], [1186], [1187], [1188], [1189], [1190], [1191],

[1192], [1193], [1194], [1196], [1197], [1198], [1199], [1200], [1201], [1202], [1203], [1205], [1207], [1208], [1209], [1210], [1211], [1212], [1213], [1214], [1215], [1216], [1219], [1220], [1221], [1222], [1223], [1224], [1225], [1226], [1227], [1229], [1230], [1232], [1234], [1235], [1236], [1237], [1238], [1239], [1244], [1245], [1246], [1247], [1250], [1251], [1255], [1256], [1257], [1258], [1259], [1260], [1261], [1262], [1263], [1265], [1266], [1268], [1270], [1271], [1272], [1273], [1274], [1276], [1277], [1278], [1279], [1281], [1283], [1284], [1285], [1286], [1287], [1288], [1290], [1291], [1293], [1294], [1295], [1296], [1300], [1302], [1305], [1306], [1307], [1308], [1311], [1312], [1314], [1315], [1316], [1317], [1318], [1320], [1321], [1323], [1324], [1325], [1326], [1328], [1329], [1330], [1331], [1332], [1333], [1334], [1335], [1336], [1337], [1338], [1340], [1341], [1342], [1343], [1344], [1345], [1346], [1347], [1348], [1349], [1350], [1351], [1352], [1353], [1354], [1355], [1356], [1357], [1358], [1359], [1360], [1361], [1363], [1364], [1365], [1366], [1367], [1368], [1369], [1370], [1371], [1372], [1373], [1374], [1375], [1376], [1377], [1378], [1380], [1381], [1382], [1383], [1384], [1385], [1386], [1387], [1388], [1389], [1390], [1391], [1392], [1393], [1394], [1395], [1396], [1397], [1398], [1399], [1400], [1401], [1402], [1403], [1404], [1405], [1406], [1408], [1409], [1410], [1411], [1413], [1415], [1416], [1417], [1418], [1419], [1420], [1421], [1422], [1423], [1425], [1426], [1427], [1428], [1429], [1430], [1431], [1432], [1433], [1434], [1435], [1436], [1437], [1438], [1439], [1440], [1443], [1444], [1445], [1448], [1449], [1453], [1455], [1456], [1457], [1458], [1459], [1460], [1461], [1462], [1463], [1464], [1465], [1466], [1468], [1469], [1470], [1473], [1474], [1475], [1476], [1477], [1478], [1479], [1480], [1481], [1482], [1483], [1484], [1485], [1486], [1487], [1488], [1489], [1490], [1492], [1493], [1494], [1495], [1496], [1497], [1498], [1499], [1500], [1501], [1502], [1503], [1504], [1505], [1506], [1507], [1508], [1509], [1510], [1511], [1512], [1513], [1514], [1515], [1516], [1517], [1518], [1519], [1520], [1522], [1523], [1524], [1525], [1526], [1527], [1528], [1529], [1530], [1531], [1533], [1534], [1535], [1536], [1537], [1539], [1541], [1542], [1543], [1544], [1547], [1548], [1549], [1550], [1551], [1552], [1553], [1554], [1557], [1559], [1561], [1562], [1563], [1564], [1565], [1566], [1567], [1568], [1569], [1570], [1571], [1572], [1573], [1574], [1575], [1576], [1577], [1578], [1579], [1580], [1581], [1582], [1583], [1584], [1585], [1586], [1587], [1588], [1589], [1590], [1592], [1593], [1594], [1595], [1596], [1597], [1598], [1599], [1600], [1601], [1602], [1603], [1604], [1605], [1606], [1607], [1608], [1609], [1610], [1611], [1612], [1613], [1614], [1615], [1616], [1617], [1619], [1620], [1623], [1624], [1625], [1626], [1627], [1628], [1629], [1630], [1631], [1632], [1633], [1634], [1635], [1637], [1638], [1639], [1640], [1641], [1642], [1643], [1645], [1646], [1647], [1648], [1649], [1650], [1652], [1653], [1654], [1655], [1656], [1657], [1658], [1659], [1660], [1661], [1662], [1663], [1664], [1665], [1666], [1667], [1668], [1669], [1670], [1671], [1672], [1673], [1674], [1675], [1676], [1677], [1678], [1679], [1680], [1681], [1683],

[1684], [1686], [1687], [1689], [1690], [1691], [1692], [1694], [1695], [1696], [1697], [1698], [1699], [1701], [1702], [1703], [1705], [1706], [1707], [1708], [1709], [1710], [1711], [1712], [1713], [1714], [1715], [1716], [1717], [1718], [1719], [1720], [1721], [1722], [1723], [1725], [1726], [1727], [1728], [1729], [1730], [1731], [1732], [1733], [1734], [1735], [1736], [1737], [1738], [1740], [1741], [1742], [1743], [1744], [1745], [1746], [1747], [1748], [1749], [1751], [1752], [1753], [1754], [1755], [1757], [1758], [1759], [1760], [1763], [1764], [1765], [1766], [1767], [1768], [1771], [1772], [1773], [1774], [1775], [1776], [1777], [1778], [1779], [1780], [1781], [1782], [1783], [1784], [1785], [1786], [1787], [1788], [1789], [1790], [1791], [1792], [1793], [1794], [1795], [1796], [1797], [1798], [1799], [1800], [1801], [1802], [1803], [1804], [1805], [1806], [1808], [1809], [1810], [1811], [1812], [1813], [1814], [1815], [1818], [1819], [1820], [1821], [1823], [1824], [1825], [1826], [1827], [1828], [1829], [1830], [1831], [1832], [1834], [1836], [1838], [1841], [1843], [1844], [1845], [1846], [1848], [1849], [1850], [1851], [1852], [1853], [1854], [1855], [1856], [1857], [1858], [1859], [1860], [1861], [1862], [1863], [1864], [1865], [1866], [1867], [1868], [1869], [1870], [1872], [1874], [1875], [1877], [1878], [1879], [1880], [1881], [1882], [1883], [1885], [1886], [1887], [1888], [1890], [1891], [1892], [1893], [1894], [1895], [1896], [1897], [1898], [1899], [1900], [1901], [1902], [1903], [1904], [1905], [1906], [1907], [1908], [1909], [1910], [1911], [1912], [1913], [1914], [1915], [1916], [1917], [1918], [1919], [1920], [1921], [1922], [1923], [1924], [1925], [1926], [1927], [1928], [1929], [1930], [1931], [1933], [1934], [1935], [1938], [1939], [1940], [1942], [1943], [1944], [1945], [1946], [1947], [1948], [1949], [1950], [1952], [1953], [1954], [1955], [1956], [1957], [1958], [1960], [1961], [1962], [1963], [1964], [1965], [1966], [1967], [1968], [1969], [1970], [1971], [1972], [1973], [1974], [1975], [1976], [1977], [1978], [1979], [1980], [1981], [1983], [1984], [1985], [1986], [1987], [1988], [1989], [1990], [1991], [1992], [1993], [1994], [1995], [1997], [1998], [1999], [2000], [2001], [2002], [2003], [2004], [2005], [2006], [2007], [2008], [2009], [2010], [2011], [2012], [2014], [2015], [2016], [2017], [2018], [2020], [2021], [2022], [2024], [2025], [2026], [2027], [2028], [2029], [2030], [2033], [2034], [2035], [2036], [2037], [2038], [2040], [2043], [2044], [2045], [2046], [2047], [2049], [2051], [2052], [2053], [2054], [2056], [2058], [2059], [2061], [2062], [2063], [2064], [2065], [2066], [2067], [2068], [2069], [2070], [2071], [2072], [2073], [2074], [2075], [2076], [2077], [2078], [2079], [2080], [2081], [2082], [2083], [2084], [2085], [2086], [2087], [2089], [2090], [2091], [2092], [2093], [2094], [2095], [2096], [2097], [2098], [2099], [2100], [2101], [2102], [2103], [2105], [2106], [2107], [2108], [2113], [2116], [2119], [2120], [2122], [2123], [2128], [2131], [2133], [2134], [2135], [2136], [2138], [2139], [2140], [2141], [2142], [2143], [2144], [2145], [2146], [2147], [2148], [2149], [2151], [2152], [2153], [2154], [2155], [2156], [2157], [2158], [2159], [2160], [2161], [2163], [2164], [2165], [2169], [2170], [2172], [2174], [2176], [2178], [2181],

[2182], [2183], [2184], [2185], [2186], [2188], [2189], [2190], [2192], [2193], [2195], [2196], [2197], [2200], [2202], [2203], [2206], [2208], [2211], [2212], [2213], [2217], [2219], [2221], [2222], [2223], [2224], [2225], [2226], [2227], [2228], [2230], [2231], [2232], [2233], [2234], [2235], [2236], [2238], [2239], [2240], [2241], [2242], [2243], [2244], [2245], [2246], [2247], [2248], [2249], [2250], [2252], [2253], [2254], [2255], [2256], [2257], [2258], [2259], [2260], [2261], [2262], [2263], [2264], [2265], [2266], [2267], [2268], [2269], [2270], [2272], [2273], [2274], [2275], [2276], [2277], [2278], [2279], [2280], [2281], [2282], [2285], [2287], [2288], [2289], [2290], [2291], [2293], [2294], [2295], [2297], [2298], [2299], [2300], [2301], [2302], [2304], [2307], [2308], [2309], [2310], [2312], [2313], [2314], [2315], [2316], [2317], [2319], [2320], [2321], [2322], [2323], [2324], [2325], [2326], [2327], [2328], [2329], [2330], [2331], [2332], [2333], [2334], [2335], [2336], [2337], [2338], [2339], [2340], [2342], [2343], [2344], [2345], [2346], [2347], [2348], [2350], [2351], [2352], [2353], [2354], [2355], [2356], [2357], [2358], [2359], [2360], [2361], [2362], [2363], [2364], [2365], [2366], [2367], [2368], [2369], [2370], [2371], [2372], [2373], [2374], [2375], [2376], [2377], [2378], [2379], [2380], [2381], [2382], [2383], [2384], [2385], [2386], [2387], [2388], [2389], [2390], [2391], [2392], [2393], [2394], [2395], [2396], [2397], [2398], [2399], [2400], [2401], [2402], [2403], [2404], [2405], [2406], [2407], [2408], [2409], [2410], [2411], [2412], [2413], [2414], [2415], [2416], [2417], [2418], [2419], [2420], [2421], [2422], [2423], [2424], [2425], [2426], [2427], [2429], [2430], [2431], [2432], [2433], [2434], [2435], [2436], [2437], [2438], [2439], [2440], [2441], [2442], [2443], [2444], [2445], [2446], [2447], [2448], [2449], [2450], [2451], [2452], [2453], [2454], [2455], [2456], [2457], [2458], [2459], [2460], [2461], [2462], [2463], [2464], [2465], [2466], [2467], [2468], [2469], [2470], [2471], [2472], [2473], [2474], [2475], [2476], [2477], [2478], [2479], [2480], [2481], [2482], [2483], [2484], [2485], [2486], [2487], [2489], [2490], [2491], [2492], [2493], [2494], [2495], [2496], [2497], [2499], [2500], [2501], [2502], [2503], [2504], [2505], [2506], [2507], [2508], [2509], [2510], [2511], [2512], [2513], [2514], [2515], [2516], [2517], [2519], [2520], [2521], [2522], [2524], [2525], [2526], [2527], [2529], [2530], [2533], [2534], [2535], [2539], [2540], [2541], [2542], [2545], [2551], [2552], [2554], [2555], [2556], [2557], [2558], [2559], [2560], [2561], [2562], [2564], [2565], [2566], [2567], [2568], [2569], [2570], [2571], [2572], [2574], [2575], [2576], [2577], [2578], [2579], [2580], [2581], [2582], [2586], [2587], [2589], [2590], [2591], [2592], [2593], [2594], [2595], [2596], [2597], [2598], [2599], [2600], [2601], [2602], [2603], [2604], [2605], [2606], [2608], [2609], [2610], [2611], [2612], [2614], [2615], [2616], [2617], [2618], [2619], [2620], [2621], [2622], [2623], [2624], [2626], [2627], [2628], [2629], [2631], [2632], [2633], [2634], [2636], [2638], [2639], [2640], [2641], [2642], [2643], [2644], [2645], [2646], [2647], [2650], [2655], [2656], [2658], [2659], [2660], [2661], [2663], [2664], [2667], [2670], [2675], [2677], [2678], [2679],

[illegible]

[3138], [3139], [3140], [3141], [3142], [3143], [3144], [3145], [3146], [3147], [3148], [3149], [3150], [3151], [3153], [3155], [3156], [3158], [3159], [3160], [3162], [3164], [3165], [3166], [3169], [3170], [3171], [3174], [3175], [3176], [3177], [3178], [3179], [3180], [3183], [3184], [3185], [3186], [3187], [3188], [3189], [3190], [3191], [3192], [3193], [3195], [3196], [3197], [3201], [3202], [3203], [3204], [3205], [3206], [3207], [3208], [3209], [3210], [3212], [3213], [3214], [3215], [3216], [3220], [3221], [3222], [3223], [3224], [3225], [3227], [3231], [3234], [3235], [3236], [3237], [3238], [3241], [3243], [3244], [3245], [3247], [3248], [3249], [3250], [3252], [3253], [3255], [3256], [3257], [3258], [3261], [3262], [3263], [3265], [3267], [3268], [3269], [3270], [3271], [3272], [3273], [3274], [3275], [3276], [3277], [3278], [3279], [3280], [3281], [3282], [3283], [3284], [3285], [3286], [3287], [3288], [3289], [3290], [3291], [3292], [3293], [3294], [3295], [3296], [3297], [3298], [3299], [3300], [3301], [3302], [3303], [3304], [3305], [3306], [3307], [3309], [3310], [3311], [3312], [3313], [3314], [3315], [3316], [3317], [3318], [3319], [3320], [3321], [3323], [3324], [3325], [3327], [3328], [3329], [3331], [3332], [3333], [3334], [3335], [3336], [3337], [3338], [3339], [3340], [3341], [3342], [3343], [3344], [3345], [3346], [3347], [3348], [3349], [3350], [3351], [3352], [3353], [3354], [3355], [3356], [3357], [3358], [3359], [3360], [3361], [3362], [3363], [3364], [3365], [3367], [3368], [3369], [3370], [3371], [3372], [3373], [3374], [3375], [3376], [3377], [3378], [3379], [3380], [3381], [3382], [3383], [3384], [3385], [3386], [3387], [3388], [3389], [3390], [3391], [3392], [3393], [3394], [3395], [3396], [3397], [3399], [3400], [3401], [3402], [3403], [3404], [3405], [3406], [3407], [3408], [3409], [3410], [3411], [3413], [3414], [3415], [3417], [3418], [3419], [3421], [3422], [3423], [3424], [3425], [3426], [3428], [3429], [3430], [3431], [3432], [3433], [3434], [3435], [3437], [3439], [3440], [3441], [3444], [3445], [3446], [3447], [3448], [3449], [3450], [3451], [3453], [3454], [3455], [3456], [3457], [3458], [3459], [3460], [3461], [3462], [3463], [3464], [3465], [3466], [3468], [3469], [3470], [3471], [3472], [3473], [3474], [3475], [3476], [3477], [3478], [3479], [3480], [3481], [3483], [3484], [3485], [3486], [3487], [3488], [3489], [3490], [3491], [3492], [3493], [3494], [3495], [3496], [3497], [3498], [3500], [3501], [3502], [3503], [3504], [3506], [3507], [3508], [3509], [3510], [3511], [3512], [3513], [3514], [3515], [3516], [3517], [3518], [3519], [3520], [3521], [3522], [3523], [3524], [3525], [3526], [3527], [3528], [3529], [3530], [3531], [3532], [3533], [3534], [3535], [3536], [3537], [3538], [3539], [3540], [3541], [3543], [3544], [3545], [3547], [3548], [3549], [3550], [3554], [3555], [3556], [3558], [3559], [3560], [3561], [3563], [3564], [3566], [3567], [3568], [3569], [3570], [3571], [3572], [3573], [3574], [3575], [3576], [3577], [3578], [3579], [3580], [3583], [3584], [3585], [3586], [3587], [3588], [3589], [3591], [3592], [3593], [3594], [3595], [3596], [3597], [3599], [3600], [3602], [3603], [3604], [3607], [3609], [3611], [3612], [3614], [3615], [3617], [3620], [3622], [3624], [3625], [3626], [3627], [3628], [3629], [3630], [3631], [3632],

[3633], [3634], [3635], [3636], [3637], [3638], [3639], [3640], [3641], [3642], [3643], [3644], [3645], [3646], [3647], [3648], [3649], [3650], [3651], [3652], [3653], [3654], [3655], [3656], [3657], [3658], [3659], [3660], [3661], [3662], [3663], [3664], [3665], [3666], [3667], [3668], [3669], [3670], [3671], [3672], [3673], [3674], [3675], [3676], [3677], [3678], [3679], [3680], [3681], [3682], [3683], [3684], [3685], [3686], [3687], [3688], [3689], [3690], [3691], [3692], [3694], [3695], [3696], [3697], [3698], [3699], [3700], [3701], [3702], [3703], [3704], [3705], [3706], [3707], [3709], [3710], [3711], [3712], [3713], [3714], [3715], [3716], [3717], [3718], [3719], [3720], [3721], [3722], [3723], [3724], [3725], [3726], [3727], [3728], [3729], [3730], [3731], [3732], [3733], [3734], [3735], [3736], [3737], [3738], [3739], [3740], [3741], [3742], [3743], [3744], [3745], [3746], [3747], [3748], [3749], [3750], [3752], [3753], [3754], [3755], [3756], [3758], [3759], [3760], [3761], [3762], [3764], [3765], [3766], [3767], [3768], [3769], [3770], [3772], [3773], [3774], [3775], [3776], [3777], [3779], [3780], [3781], [3782], [3783], [3784], [3785], [3786], [3787], [3788], [3789], [3790], [3791], [3792], [3793], [3794], [3795], [3796], [3797], [3798], [3799], [3800], [3801], [3802], [3803], [3804], [3805], [3806], [3807], [3808], [3809], [3811], [3812], [3813], [3814], [3815], [3816], [3817], [3818], [3819], [3820], [3821], [3822], [3823], [3824], [3825], [3826], [3827], [3828], [3829], [3830], [3831], [3833], [3834], [3835], [3836], [3837], [3838], [3839], [3840], [3841], [3842], [3843], [3844], [3845], [3846], [3848], [3849], [3850], [3851], [3852], [3853], [3854], [3855], [3856], [3857], [3858], [3859], [3860], [3861], [3862], [3863], [3864], [3865], [3866], [3867], [3868], [3869], [3870], [3871], [3872], [3873], [3874], [3875], [3876], [3877], [3879], [3880], [3881], [3882], [3883], [3884], [3885], [3886], [3887], [3888], [3889], [3890], [3891], [3892], [3893], [3894], [3895], [3896], [3897], [3898], [3899], [3901], [3902], [3903], [3904], [3905], [3906], [3907], [3908], [3909], [3910], [3911], [3912], [3913], [3914], [3915], [3916], [3917], [3918], [3919], [3920], [3921], [3922], [3923], [3924], [3925], [3926], [3927], [3928], [3929], [3930], [3931], [3932], [3933], [3934], [3935], [3936], [3937], [3938], [3939], [3940], [3941], [3942], [3943], [3944], [3945], [3946], [3947], [3948], [3949], [3950], [3951], [3952], [3953], [3954], [3955], [3956], [3957], [3958], [3959], [3960], [3961], [3962], [3963], [3964], [3965], [3966], [3967], [3968], [3969], [3970], [3971], [3972], [3973], [3974], [3975], [3976], [3977], [3978], [3979], [3980], [3981], [3982], [3983], [3984], [3985], [3986], [3987], [3988], [3989], [3990], [3996], [3998], [4000], [4004], [4013], [4016], [4017], [4021], [4022], [4023], [4024], [4026], [4028], [4029], [4030], [4031], [4032], [4033], [4034], [4035], [4036], [4037], [4038], [4039], [4040], [4042], [4043], [4044], [4045], [4046], [4047], [4048], [4049], [4050], [4051], [4053], [4054], [4055], [4056], [4057], [4058], [4059], [4060], [4061], [4062], [4063], [4064], [4065], [4066], [4068], [4069], [4070], [4071], [4072], [4073], [4074], [4075], [4076], [4077], [4078], [4079], [4080], [4082], [4083], [4085], [4086], [4087], [4088], [4090], [4091], [4092], [4093],

[4094], [4095], [4096], [4097], [4098], [4099], [4100], [4101], [4102], [4103], [4104], [4105], [4106], [4108], [4109], [4110], [4111], [4112], [4113], [4114], [4115], [4116], [4117], [4118], [4119], [4120], [4121], [4122], [4123], [4124], [4125], [4126], [4127], [4128], [4129], [4130], [4131], [4132], [4133], [4134], [4135], [4136], [4137], [4138], [4139], [4140], [4142], [4143], [4144], [4145], [4146], [4147], [4148], [4149], [4150], [4151], [4153], [4154], [4155], [4156], [4157], [4158], [4159], [4160], [4161], [4162], [4163], [4164], [4165], [4166], [4167], [4168], [4169], [4170], [4171], [4172], [4173], [4174], [4175], [4177], [4178], [4179], [4180], [4181], [4182], [4183], [4184], [4185], [4186], [4187], [4188], [4189], [4190], [4191], [4192], [4193], [4194], [4195], [4196], [4197], [4198], [4199], [4200], [4201], [4202], [4203], [4204], [4205], [4206], [4207], [4208], [4209], [4210], [4211], [4212], [4213], [4214], [4215], [4216], [4217], [4218], [4219], [4221], [4222], [4225], [4229], [4230], [4231], [4232], [4233], [4234], [4235], [4236], [4237], [4238], [4239], [4240], [4241], [4242], [4243], [4244], [4245], [4246], [4247], [4248], [4249], [4250], [4251], [4252], [4253], [4254], [4255], [4256], [4257], [4258], [4259], [4260], [4261], [4262], [4263], [4264], [4265], [4266], [4267], [4268], [4269], [4270], [4271], [4272], [4273], [4274], [4275], [4276], [4277], [4278], [4279], [4280], [4282], [4283], [4284], [4285], [4286], [4287], [4288], [4289], [4290], [4291], [4292], [4293], [4295], [4296], [4297], [4298], [4299], [4300], [4301], [4302], [4303], [4305], [4306], [4307], [4308], [4309], [4310], [4311], [4312], [4313], [4314], [4315], [4316], [4317], [4318], [4319], [4320], [4321], [4322], [4323], [4324], [4325], [4326], [4327], [4328], [4330], [4332], [4333], [4334], [4336], [4337], [4338], [4339], [4340], [4341], [4342], [4344], [4345], [4346], [4347], [4349], [4350], [4351], [4352], [4353], [4355], [4356], [4358], [4359], [4360], [4361], [4362], [4363], [4364], [4365], [4366], [4367], [4368], [4369], [4370], [4373], [4375], [4376], [4377], [4378], [4379], [4380], [4381], [4382], [4384], [4385], [4387], [4388], [4389], [4390], [4391], [4392], [4393], [4394], [4395], [4396], [4397], [4398], [4399], [4400], [4401], [4402], [4404], [4405], [4407], [4408], [4409], [4410], [4411], [4412], [4413], [4414], [4415], [4416], [4417], [4418], [4419], [4420], [4421], [4422], [4423], [4424], [4425], [4426], [4427], [4428], [4429], [4430], [4431], [4432], [4433], [4434], [4435], [4436], [4437], [4438], [4439], [4440], [4441], [4442], [4443], [4444], [4445], [4446], [4447], [4448], [4449], [4450], [4451], [4452], [4453], [4454], [4455], [4456], [4457], [4458], [4459], [4460], [4462], [4463], [4464], [4465], [4466], [4467], [4468], [4469], [4470], [4473], [4474], [4475], [4476], [4477], [4478], [4480], [4481], [4482], [4483], [4484], [4485], [4487], [4488], [4489], [4492], [4493], [4494], [4495], [4497], [4498], [4499], [4500], [4501], [4502], [4504], [4505], [4506], [4507], [4508], [4509], [4510], [4511], [4512], [4513], [4515], [4516], [4517], [4518], [4519], [4520], [4521], [4522], [4523], [4524], [4525], [4526], [4528], [4529], [4533], [4534], [4535], [4537], [4538], [4539], [4541], [4542], [4543], [4544], [4545], [4546], [4549], [4550], [4552], [4554], [4555], [4557], [4560], [4563],

[4565], [4566], [4567], [4568], [4569], [4571], [4572], [4573], [4574], [4575], [4576], [4578], [4579], [4586], [4587], [4591], [4592], [4593], [4594], [4595], [4596], [4597], [4598], [4599], [4600], [4601], [4602], [4603], [4604], [4605], [4606], [4607], [4608], [4609], [4610], [4611], [4612], [4613], [4614], [4615], [4616], [4617], [4618], [4619], [4620], [4622], [4623], [4626], [4630], [4631], [4633], [4637], [4639], [4643], [4645], [4647], [4651], [4652], [4653], [4654], [4655], [4656], [4657], [4658], [4659], [4660], [4661], [4662], [4663], [4664], [4665], [4666], [4667], [4668], [4669], [4670], [4671], [4672], [4673], [4674], [4675], [4676], [4677], [4678], [4679], [4680], [4681], [4682], [4683], [4684], [4685], [4686], [4687], [4688], [4689], [4690], [4691], [4692], [4693], [4694], [4695], [4696], [4697], [4698], [4699], [4700], [4701], [4702], [4703], [4704], [4705], [4706], [4707], [4708], [4709], [4710], [4711], [4712], [4713], [4714], [4715], [4716], [4717], [4718], [4719], [4720], [4721], [4722], [4723], [4724], [4725], [4726], [4727], [4728], [4729], [4730], [4731], [4732], [4733], [4734], [4735], [4736], [4737], [4738], [4739], [4740], [4743], [4747], [4748], [4749], [4750], [4751], [4752], [4754], [4755], [4756], [4757], [4763], [4764], [4765], [4766], [4767], [4771], [4772], [4773], [4775], [4776], [4777], [4778], [4780], [4781], [4782], [4783], [4784], [4785], [4786], [4787], [4788], [4789], [4790], [4791], [4792], [4793], [4794], [4795], [4799], [4800], [4801], [4802], [4803], [4804], [4805], [4806], [4807], [4808], [4809], [4810], [4811], [4812], [4813], [4815], [4816], [4817], [4818], [4819], [4820], [4821], [4822], [4823], [4824], [4825], [4826], [4827], [4828], [4829], [4830], [4832], [4835], [4837], [4840], [4844], [4847], [4849], [4850], [4851], [4852], [4854], [4855], [4857], [4858], [4860], [4861], [4862], [4863], [4864], [4865], [4866], [4867], [4868], [4869], [4870], [4871], [4872], [4873], [4875], [4876], [4877], [4878], [4880], [4881], [4882], [4883], [4884], [4885], [4886], [4887], [4888], [4889], [4890], [4891], [4892], [4893], [4894], [4895], [4896], [4897], [4899], [4901], [4902], [4903], [4904], [4905], [4906], [4908], [4909], [4911], [4912], [4913], [4914], [4915], [4916], [4917], [4918], [4919], [4920], [4921], [4923], [4924], [4925], [4926], [4927], [4928], [4929], [4930], [4931], [4932], [4933], [4934], [4935], [4936], [4937], [4938], [4939], [4940], [4941], [4942], [4943], [4944], [4945], [4946], [4947], [4948], [4949], [4950], [4951], [4952], [4953], [4954], [4955], [4956], [4957], [4958], [4959], [4960], [4961], [4962], [4963], [4964], [4965], [4966], [4967], [4968], [4969], [4970], [4971], [4972], [4973], [4975], [4976], [4977], [4978], [4979], [4980], [4981], [4982], [4983], [4984], [4985], [4986], [4987], [4988], [4989], [4990], [4991], [4992], [4993], [4994], [4995], [4996], [4997], [4998], [4999], [5000], [5001], [5002], [5003], [5004], [5005], [5006], [5007], [5008], [5009], [5010], [5012], [5015], [5016], [5017], [5018], [5019], [5020], [5021], [5023], [5024], [5025], [5028], [5030], [5031], [5032], [5034], [5036], [5037], [5039], [5040], [5042], [5043], [5044], [5046], [5047], [5048], [5049], [5050], [5051], [5052], [5056], [5057], [5058], [5062], [5063], [5065], [5066], [5067], [5068], [5069], [5071], [5072], [5073], [5074], [5075],

[5076], [5078], [5081], [5083], [5084], [5085], [5086], [5087], [5090], [5091], [5092], [5098], [5099], [5100], [5101], [5102], [5103], [5105], [5106], [5107], [5108], [5109], [5110], [5111], [5112], [5113], [5114], [5117], [5118], [5119], [5120], [5121], [5122], [5123], [5124], [5125], [5126], [5127], [5128], [5129], [5130], [5132], [5133], [5134], [5136], [5137], [5138], [5140], [5141], [5143], [5145], [5148], [5149], [5150], [5151], [5152], [5153], [5155], [5159], [5160], [5161], [5162], [5163], [5164], [5165], [5166], [5167], [5168], [5169], [5170], [5171], [5172], [5173], [5174], [5175], [5176], [5177], [5178], [5179], [5180], [5181], [5182], [5183], [5184], [5185], [5186], [5187], [5188], [5189], [5190], [5191], [5193], [5195], [5201], [5202], [5204], [5205], [5206], [5208], [5209], [5210], [5211], [5212], [5218], [5219], [5220], [5221], [5222], [5223], [5224], [5225], [5226], [5227], [5228], [5229], [5230], [5231], [5232], [5233], [5234], [5235], [5236], [5237], [5238], [5239], [5240], [5241], [5242], [5243], [5244], [5245], [5247], [5248], [5249], [5250], [5251], [5252], [5254], [5255], [5257], [5258], [5259], [5261], [5262], [5263], [5264], [5265], [5266], [5268], [5270], [5271], [5272], [5273], [5275], [5277], [5279], [5280], [5281], [5283], [5285], [5286], [5287], [5288], [5289], [5291], [5292], [5293], [5294], [5295], [5296], [5297], [5298], [5299], [5300], [5301], [5302], [5305], [5306], [5310], [5311], [5312], [5313], [5314], [5315], [5316], [5317], [5318], [5319], [5320], [5321], [5322], [5323], [5324], [5325], [5326], [5327], [5328], [5329], [5330], [5331], [5332], [5333], [5334], [5335], [5336], [5337], [5338], [5339], [5340], [5341], [5342], [5343], [5344], [5345], [5346], [5347], [5348], [5349], [5350], [5351], [5352], [5353], [5354], [5355], [5356], [5357], [5358], [5359], [5360], [5361], [5362], [5363], [5364], [5365], [5366], [5367], [5368], [5369], [5370], [5371], [5372], [5374], [5375], [5376], [5378], [5379], [5380], [5381], [5383], [5384], [5385], [5387], [5388], [5391], [5392], [5393], [5394], [5395], [5397], [5398], [5399], [5401], [5402], [5403], [5404], [5405], [5406], [5407], [5408], [5409], [5410], [5411], [5412], [5413], [5414], [5416], [5418], [5419], [5420], [5421], [5422], [5423], [5425], [5426], [5427], [5428], [5429], [5430], [5431], [5433], [5434], [5435], [5436], [5437], [5439], [5440], [5441], [5442], [5443], [5444], [5445], [5446], [5447], [5448], [5449], [5451], [5452], [5454], [5455], [5456], [5457], [5458], [5459], [5461], [5462], [5463], [5464], [5465], [5466], [5467], [5468], [5469], [5470], [5472], [5473], [5474], [5475], [5476], [5477], [5478], [5479], [5480], [5481], [5482], [5483], [5484], [5485], [5486], [5487], [5488], [5489], [5490], [5492], [5493], [5494], [5495], [5496], [5499], [5500], [5501], [5503], [5504], [5505], [5506], [5507], [5508], [5509], [5510], [5511], [5513], [5514], [5515], [5516], [5517], [5518], [5520], [5521], [5522], [5523], [5524], [5525], [5526], [5527], [5528], [5529], [5530], [5531], [5532], [5533], [5534], [5535], [5536], [5537], [5538], [5539], [5540], [5541], [5542], [5543], [5544], [5545], [5546], [5547], [5548], [5549], [5550], [5551], [5552], [5553], [5554], [5557], [5558], [5559], [5560], [5561], [5562], [5563], [5564], [5565], [5566], [5567], [5569], [5570], [5571], [5572], [5573], [5574], [5575],

[5576], [5577], [5578], [5579], [5580], [5584], [5586], [5590], [5595], [5601], [5607], [5612], [5614], [5615], [5616], [5617], [5618], [5619], [5620], [5621], [5622], [5623], [5624], [5625], [5626], [5627], [5628], [5629], [5630], [5631], [5632], [5633], [5634], [5635], [5636], [5638], [5639], [5640], [5641], [5642], [5643], [5644], [5645], [5646], [5647], [5648], [5650], [5651], [5652], [5653], [5654], [5655], [5656], [5657], [5659], [5661], [5662], [5663], [5664], [5665], [5666], [5667], [5668], [5669], [5670], [5673], [5674], [5675], [5677], [5678], [5681], [5682], [5683], [5685], [5687], [5688], [5689], [5690], [5692], [5694], [5695], [5696], [5700], [5701], [5702], [5703], [5705], [5706], [5707], [5708], [5711], [5712], [5714], [5715], [5716], [5717], [5718], [5719], [5720], [5722], [5723], [5724], [5727], [5729], [5731], [5732], [5734], [5735], [5736], [5737], [5738], [5740], [5741], [5742], [5743], [5744], [5745], [5747], [5748], [5749], [5750], [5751], [5752], [5753], [5754], [5755], [5756], [5757], [5758], [5759], [5760], [5761], [5762], [5763], [5764], [5765], [5766], [5767], [5768], [5769], [5770], [5771], [5772], [5773], [5774], [5775], [5776], [5777], [5778], [5779], [5780], [5781], [5782], [5783], [5784], [5785], [5786], [5787], [5788], [5789], [5790], [5791], [5792], [5793], [5794], [5795], [5796], [5797], [5798], [5800], [5801], [5802], [5803], [5804], [5805], [5806], [5807], [5808], [5810], [5811], [5812], [5813], [5814], [5815], [5816], [5817], [5818], [5819], [5820], [5821], [5822], [5823], [5824], [5825], [5826], [5827], [5828], [5829], [5830], [5831], [5832], [5833], [5834], [5835], [5836], [5837], [5838], [5839], [5840], [5841], [5842], [5843], [5844], [5845], [5846], [5847], [5848], [5849], [5850], [5851], [5852], [5853], [5854], [5855], [5857], [5859], [5860], [5861], [5862], [5863], [5864], [5866], [5867], [5868], [5869], [5870], [5871], [5872], [5873], [5874], [5875], [5876], [5877], [5878], [5879], [5880], [5881], [5882], [5883], [5884], [5885], [5886], [5887], [5888], [5889], [5890], [5891], [5892], [5893], [5894], [5895], [5896], [5897], [5898], [5899], [5900], [5901], [5902], [5903], [5904], [5905], [5906], [5907], [5908], [5909], [5910], [5912], [5913], [5916], [5917], [5918], [5919], [5920], [5921], [5924], [5929], [5930], [5931], [5932], [5933], [5934], [5935], [5937], [5938], [5941], [5942], [5944], [5945], [5946], [5947], [5948], [5949], [5950], [5951], [5952], [5953], [5954], [5955], [5957], [5958], [5959], [5960], [5961], [5962], [5963], [5964], [5965], [5966], [5967], [5968], [5969], [5970], [5971], [5972], [5973], [5974], [5975], [5976], [5977], [5978], [5979], [5980], [5981], [5982], [5983], [5984], [5985], [5986], [5987], [5988], [5989], [5990], [5991], [5992], [5993], [5994], [5995], [5996], [5997], [5998], [5999], [6000], [6001], [6002], [6003], [6004], [6005], [6006], [6007], [6008], [6009], [6010], [6011], [6012], [6013], [6014], [6015], [6016], [6017], [6018], [6019], [6020], [6021], [6022], [6023], [6024], [6025], [6026], [6027], [6028], [6029], [6030], [6031], [6032], [6033], [6034], [6035], [6036], [6037], [6038], [6039], [6040], [6041], [6043], [6044], [6045], [6046], [6047], [6048], [6049], [6050], [6051], [6052], [6053], [6054], [6055], [6057], [6058], [6059], [6060], [6061], [6062], [6063], [6065], [6069], [6070], [6072], [6073],

[6075], [6076], [6077], [6079], [6080], [6081], [6085], [6086], [6087], [6089], [6090], [6091], [6092], [6093], [6094], [6095], [6096], [6097], [6098], [6099], [6100], [6101], [6102], [6103], [6104], [6105], [6106], [6107], [6108], [6109], [6110], [6111], [6112], [6113], [6114], [6115], [6116], [6117], [6118], [6119], [6120], [6121], [6122], [6124], [6125], [6126], [6127], [6129], [6130], [6131], [6133], [6134], [6136], [6137], [6138], [6139], [6140], [6141], [6142], [6143], [6144], [6145], [6146], [6147], [6148], [6149], [6150], [6151], [6152], [6153], [6154], [6155], [6157], [6158], [6159], [6160], [6161], [6162], [6163], [6164], [6165], [6166], [6168], [6169], [6170], [6172], [6173], [6174], [6176], [6178], [6179], [6180], [6182], [6183], [6184], [6185], [6186], [6187], [6188], [6189], [6190], [6191], [6192], [6193], [6194], [6196], [6197], [6198], [6199], [6200], [6202], [6204], [6205], [6206], [6208], [6209], [6210], [6211], [6212], [6214], [6215], [6216], [6217], [6219], [6220], [6221], [6222], [6223], [6224], [6225], [6226], [6228], [6229], [6230], [6231], [6233], [6235], [6238], [6239], [6240], [6241], [6242], [6243], [6244], [6245], [6246], [6248], [6249], [6250], [6251], [6252], [6253], [6254], [6255], [6256], [6257], [6259], [6261], [6262], [6265], [6267], [6271], [6272], [6273], [6274], [6275], [6276], [6278], [6279], [6280], [6281], [6282], [6283], [6284], [6285], [6286], [6287], [6288], [6289], [6290], [6291], [6292], [6293], [6294], [6295], [6296], [6298], [6299], [6300], [6301], [6302], [6303], [6304], [6305], [6306], [6307], [6308], [6309], [6311], [6312], [6313], [6314], [6315], [6316], [6317], [6318], [6319], [6321], [6322], [6323], [6324], [6325], [6326], [6327], [6328], [6329], [6330], [6331], [6332], [6333], [6334], [6335], [6336], [6337], [6338], [6339], [6340], [6341], [6342], [6343], [6344], [6345], [6346], [6347], [6348], [6349], [6350], [6351], [6352], [6353], [6354], [6355], [6356], [6357], [6358], [6359], [6360], [6361], [6362], [6363], [6364], [6365], [6366], [6367], [6368], [6369], [6370], [6371], [6372], [6373], [6374], [6376], [6377], [6378], [6379], [6380], [6382], [6383], [6384], [6385], [6386], [6387], [6388], [6389], [6390], [6391], [6392], [6393], [6394], [6395], [6396], [6397], [6398], [6399], [6400], [6401], [6402], [6403], [6405], [6407], [6409], [6410], [6411], [6412], [6413], [6414], [6415], [6417], [6418], [6419], [6421], [6422], [6423], [6424], [6425], [6426], [6427], [6428], [6429], [6430], [6431], [6432], [6433], [6434], [6435], [6436], [6437], [6438], [6439], [6440], [6441], [6442], [6443], [6444], [6445], [6446], [6447], [6448], [6449], [6450], [6451], [6452], [6453], [6454], [6455], [6456], [6457], [6459], [6460], [6461], [6463], [6464], [6465], [6466], [6467], [6468], [6470], [6471], [6472], [6476], [6477], [6478], [6479], [6480], [6481], [6482], [6483], [6484], [6485], [6486], [6487], [6488], [6489], [6490], [6491], [6492], [6493], [6494], [6495], [6496], [6497], [6498], [6499], [6500], [6501], [6502], [6503], [6504], [6505], [6506], [6507], [6508], [6509], [6512], [6513], [6514], [6515], [6516], [6517], [6518], [6519], [6520], [6521], [6522], [6523], [6524], [6525], [6526], [6527], [6528], [6529], [6530], [6533], [6534], [6535], [6536], [6537], [6538], [6539], [6540], [6541], [6542], [6543], [6544], [6545], [6546], [6547], [6548],

[6549], [6550], [6551], [6552], [6553], [6554], [6555], [6556], [6558], [6559], [6560], [6561], [6563], [6564], [6565], [6566], [6567], [6568], [6569], [6570], [6571], [6572], [6574], [6575], [6576], [6577], [6578], [6579], [6580], [6581], [6582], [6583], [6584], [6585], [6586], [6587], [6588], [6589], [6590], [6591], [6592], [6593], [6594], [6595], [6596], [6597], [6598], [6599], [6601], [6602], [6603], [6604], [6605], [6606], [6608], [6609], [6610], [6611], [6612], [6613], [6614], [6616], [6617], [6618], [6619], [6620], [6621], [6622], [6623], [6624], [6625], [6626], [6627], [6628], [6629], [6630], [6631], [6632], [6633], [6634], [6635], [6636], [6637], [6638], [6639], [6640], [6641], [6642], [6643], [6644], [6645], [6646], [6648], [6649], [6650], [6651], [6652], [6653], [6654], [6655], [6656], [6657], [6658], [6659], [6660], [6661], [6662], [6663], [6666], [6667], [6668], [6669], [6670], [6671], [6672], [6673], [6674], [6675], [6676], [6677], [6678], [6679], [6680], [6681], [6682], [6683], [6684], [6686], [6687], [6688], [6689], [6690], [6691], [6692], [6693], [6694], [6695], [6696], [6697], [6698], [6699], [6700], [6701], [6703], [6704], [6705], [6707], [6708], [6709], [6710], [6711], [6712], [6713], [6714], [6715], [6716], [6717], [6718], [6719], [6721], [6723], [6724], [6728], [6729], [6731], [6732], [6734], [6736], [6739], [6740], [6746], [6748], [6749], [6751], [6752], [6753], [6754], [6755], [6756], [6757], [6758], [6759], [6760], [6761], [6762], [6763], [6764], [6765], [6766], [6767], [6768], [6769], [6770], [6771], [6772], [6773], [6774], [6775], [6776], [6777], [6778], [6779], [6780], [6781], [6782], [6783], [6784], [6785], [6786], [6787], [6788], [6789], [6790], [6791], [6792], [6793], [6794], [6795], [6796], [6797], [6798], [6799], [6800], [6801], [6802], [6803], [6804], [6805], [6806], [6807], [6808], [6809], [6810], [6812], [6813], [6814], [6815], [6816], [6818], [6819], [6821], [6822], [6823], [6824], [6825], [6826], [6827], [6828], [6829], [6830], [6831], [6832], [6833], [6834], [6837], [6838], [6839], [6840], [6841], [6842], [6843], [6844], [6845], [6846], [6849], [6850], [6851], [6852], [6853], [6854], [6856], [6857], [6858], [6859], [6860], [6861], [6862], [6863], [6864], [6865], [6867], [6869], [6870], [6871], [6872], [6873], [6874], [6875], [6876], [6877], [6878], [6879], [6880], [6881], [6882], [6883], [6884], [6885], [6886], [6887], [6888], [6889], [6890], [6891], [6892], [6893], [6894], [6895], [6896], [6897], [6898], [6899], [6900], [6901], [6902], [6903], [6904], [6905], [6906], [6907], [6908], [6909], [6910], [6911], [6912], [6913], [6914], [6915], [6916], [6917], [6918], [6919], [6920], [6921], [6922], [6923], [6925], [6926], [6927], [6928], [6929], [6930], [6931], [6932], [6935], [6936], [6937], [6938], [6939], [6940], [6941], [6942], [6943], [6944], [6945], [6946], [6947], [6948], [6949], [6950], [6952], [6953], [6954], [6955], [6956], [6957], [6958], [6960], [6961], [6962], [6963], [6964], [6965], [6966], [6967], [6971], [6972], [6973], [6974], [6976], [6977], [6978], [6979], [6980], [6981], [6982], [6984], [6985], [6986], [6987], [6988], [6989], [6990], [6991], [6992], [6993], [6994], [6995], [6996], [6997], [6998], [6999], [7000], [7001], [7002], [7003], [7004], [7005], [7006], [7007], [7008], [7009], [7010], [7011], [7012], [7013], [7014], [7015],

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[9315], [9316], [9317], [9318], [9319], [9320], [9321], [9322], [9323], [9324], [9326], [9327], [9328], [9329], [9330], [9331], [9332], [9333], [9334], [9335], [9336], [9337], [9338], [9339], [9340], [9341], [9342], [9343], [9344], [9345], [9346], [9347], [9348], [9349], [9350], [9351], [9352], [9353], [9354], [9355], [9356], [9357], [9358], [9359], [9360], [9361], [9363], [9364], [9367], [9368], [9369], [9370], [9371], [9372], [9373], [9374], [9375], [9377], [9378], [9379], [9380], [9381], [9382], [9383], [9385], [9386], [9387], [9388], [9389], [9390], [9391], [9392], [9393], [9394], [9395], [9396], [9397], [9399], [9400], [9401], [9402], [9403], [9404], [9405], [9406], [9407], [9408], [9409], [9410], [9411], [9412], [9413], [9414], [9415], [9416], [9417], [9418], [9419], [9420], [9422], [9423], [9424], [9425], [9426], [9427], [9428], [9429], [9430], [9431], [9432], [9433], [9434], [9435], [9436], [9437], [9438], [9439], [9440], [9441], [9443], [9444], [9446], [9447], [9450], [9451], [9452], [9453], [9454], [9455], [9456], [9457], [9458], [9459], [9460], [9461], [9462], [9463], [9464], [9465], [9466], [9467], [9468], [9469], [9470], [9471], [9472], [9473], [9474], [9475], [9476], [9477], [9478], [9479], [9480], [9481], [9482], [9484], [9485], [9486], [9487], [9488], [9489], [9490], [9491], [9492], [9493], [9494], [9495], [9497], [9498], [9499], [9500], [9501], [9502], [9503], [9504], [9505], [9508], [9509], [9510], [9511], [9512], [9513], [9514], [9515], [9516], [9517], [9518], [9519], [9520], [9521], [9522], [9523], [9524], [9525], [9526], [9527], [9528], [9529], [9530], [9531], [9532], [9533], [9534], [9535], [9536], [9537], [9538], [9539], [9540], [9541], [9542], [9543], [9544], [9545], [9546], [9547], [9548], [9549], [9550], [9551], [9552], [9553], [9554], [9555], [9556], [9557], [9558], [9559], [9560], [9561], [9562], [9563], [9564], [9565], [9566], [9567], [9568], [9569], [9570], [9571], [9572], [9573], [9574], [9575], [9576], [9577], [9578], [9579], [9580], [9581], [9582], [9583], [9584], [9585], [9586], [9587], [9588], [9589], [9590], [9591], [9592], [9593], [9594], [9595], [9596], [9597], [9598], [9599], [9600], [9601], [9602], [9603], [9604], [9605], [9606], [9607], [9608], [9609], [9610], [9611], [9612], [9613], [9614], [9615], [9616], [9617], [9618], [9619], [9620], [9621], [9622], [9623], [9624], [9625], [9626], [9627], [9628], [9629], [9630], [9631], [9632], [9633], [9634], [9635], [9638], [9639], [9640], [9641], [9642], [9643], [9644], [9645], [9646], [9647], [9649], [9650], [9651], [9652], [9653], [9654], [9655], [9656], [9657], [9658], [9659], [9660], [9661], [9662], [9663], [9664], [9665], [9666], [9667], [9668], [9669], [9670], [9671], [9672], [9673], [9674], [9675], [9676], [9677], [9678], [9679], [9680], [9681], [9682], [9683], [9684], [9685], [9686], [9687], [9688], [9689], [9690], [9691], [9692], [9693], [9694], [9695], [9696], [9697], [9698], [9699], [9700], [9701], [9702], [9703], [9704], [9705], [9706], [9707], [9708], [9709], [9710], [9711], [9712], [9713], [9714], [9715], [9716], [9717], [9718], [9719], [9720], [9721], [9722], [9723], [9724], [9725], [9726], [9727], [9728], [9729], [9730], [9731], [9732], [9733], [9734], [9735], [9736], [9737], [9738], [9739], [9740], [9741], [9742], [9743], [9744], [9745], [9746], [9747], [9748], [9749], [9750], [9754],

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[12399], [12400], [12401], [12402], [12403], [12404], [12405], [12406], [12407], [12408], [12409], [12410], [12411], [12412], [12413], [12414], [12415], [12416], [12417], [12418], [12419], [12420], [12421], [12422], [12423], [12424], [12425], [12426], [12427], [12428], [12429], [12430], [12431], [12432], [12433], [12434], [12435], [12436], [12438], [12439], [12440], [12441], [12442], [12443], [12444], [12445], [12446], [12447], [12448], [12449], [12450], [12451], [12452], [12453], [12454], [12455], [12456], [12457], [12458], [12459], [12460], [12461], [12462], [12463], [12464], [12465], [12466], [12468], [12469], [12470], [12471], [12472], [12473], [12474], [12475], [12476], [12477], [12478], [12479], [12480], [12482], [12483], [12484], [12485], [12486], [12487], [12488], [12489], [12490], [12491], [12492], [12493], [12494], [12495], [12496], [12497], [12498], [12499], [12500], [12501], [12502], [12503], [12504], [12505], [12506], [12507], [12508], [12509], [12510], [12512], [12513], [12514], [12515], [12516], [12517], [12518], [12519], [12520], [12521], [12522], [12523], [12524], [12525], [12526], [12527], [12529], [12530], [12531], [12532], [12533], [12534], [12535], [12536], [12537], [12538], [12539], [12540], [12541], [12542], [12543], [12544], [12545], [12546], [12547], [12548], [12549], [12550], [12551], [12552], [12553], [12554], [12555], [12556], [12557], [12558], [12559], [12560], [12561], [12562], [12563], [12564], [12565], [12566], [12567], [12568], [12569], [12570], [12571], [12572], [12573], [12574], [12575], [12576], [12577], [12578], [12579], [12580], [12581], [12582], [12583], [12584], [12585], [12586], [12587], [12588], [12589], [12590], [12591], [12592], [12593], [12594], [12595], [12596], [12597], [12598], [12599], [12600], [12601], [12602], [12603], [12604], [12605], [12606], [12607], [12608], [12609], [12610], [12611], [12612], [12613], [12615], [12616], [12617], [12618], [12619], [12620], [12621], [12623], [12624], [12625], [12628], [12629], [12630], [12631], [12632], [12633], [12634], [12635], [12636], [12637], [12638], [12639], [12640], [12641], [12642], [12643], [12644], [12645], [12646], [12647], [12648], [12649], [12650], [12651], [12652], [12653], [12654], [12655], [12656], [12657], [12658], [12659], [12660], [12661], [12663], [12665], [12666], [12667], [12668], [12669], [12670], [12671], [12672], [12673], [12674], [12675], [12676], [12679], [12680], [12681], [12682], [12683], [12684], [12685], [12686], [12687], [12688], [12689], [12691], [12692], [12693], [12694], [12695], [12696], [12697], [12698], [12699], [12700], [12701], [12702], [12703], [12704], [12705], [12706], [12707], [12708], [12709], [12710], [12711], [12712], [12713], [12714], [12715], [12716], [12717], [12718], [12719], [12720], [12721], [12722], [12723], [12724], [12725], [12726], [12727], [12728], [12729], [12730], [12731], [12732], [12733], [12734], [12735], [12736], [12737], [12738], [12739], [12740], [12741], [12742], [12743], [12744], [12745], [12746], [12747], [12748], [12749], [12750], [12751], [12752], [12753], [12754],

[12756], [12757], [12758], [12759], [12760], [12761], [12762], [12763], [12764], [12765], [12766], [12767], [12768], [12769], [12770], [12771], [12772], [12773], [12774], [12775], [12776], [12777], [12778], [12779], [12780], [12781], [12782], [12783], [12784], [12785], [12786], [12787], [12788], [12789], [12790], [12791], [12792], [12793], [12794], [12795], [12796], [12797], [12798], [12799], [12800], [12801], [12802], [12803], [12804], [12805], [12806], [12807], [12808], [12809], [12810], [12811], [12812], [12813], [12814], [12815], [12816], [12817], [12818], [12819], [12820], [12821], [12822], [12823], [12824], [12825], [12826], [12827], [12828], [12829], [12830], [12831], [12832], [12833], [12834], [12835], [12836], [12837], [12838], [12839], [12840], [12841], [12842], [12843], [12844], [12845], [12846], [12847], [12848], [12849], [12850], [12851], [12852], [12853], [12854], [12855], [12856], [12857], [12858], [12859], [12860], [12861], [12862], [12863], [12864], [12865], [12866], [12867], [12868], [12869], [12870], [12872], [12874], [12875], [12876], [12877], [12879], [12880], [12881], [12884], [12885], [12886], [12888], [12890], [12892], [12895], [12896], [12900], [12901], [12902], [12904], [12905], [12906], [12907], [12908], [12909], [12910], [12911], [12913], [12914], [12915], [12916], [12917], [12919], [12920], [12921], [12922], [12923], [12924], [12925], [12926], [12927], [12928], [12929], [12931], [12932], [12933], [12934], [12935], [12936], [12937], [12938], [12939], [12940], [12941], [12942], [12943], [12944], [12945], [12946], [12947], [12948], [12949], [12950], [12951], [12952], [12953], [12954], [12955], [12956], [12958], [12959], [12960], [12961], [12962], [12963], [12964], [12965], [12966], [12967], [12968], [12969], [12970], [12971], [12972], [12973], [12975], [12976], [12977], [12978], [12979], [12980], [12981], [12982], [12983], [12984], [12985], [12986], [12987], [12988], [12989], [12990], [12991], [12992], [12993], [12994], [12995], [12996], [12997], [12998], [12999], [13000], [13001], [13002], [13003], [13004], [13005], [13006], [13007], [13008], [13009], [13010], [13011], [13012], [13013], [13014], [13015], [13016], [13017], [13018], [13019], [13020], [13021], [13022], [13023], [13024], [13025], [13026], [13027], [13028], [13029], [13030], [13031], [13032], [13033], [13034], [13035], [13036], [13037], [13038], [13039], [13040], [13041], [13042], [13043], [13044], [13045], [13046], [13047], [13048], [13049], [13050], [13051], [13052], [13053], [13054], [13055], [13056], [13057], [13058], [13059], [13060], [13061], [13062], [13063], [13064], [13065], [13067], [13068], [13069], [13070], [13071], [13072], [13073], [13074], [13075], [13076], [13077], [13078], [13079], [13080], [13081], [13082], [13083], [13085], [13086], [13087], [13088], [13089], [13090], [13091], [13093], [13094], [13095], [13096], [13097], [13098], [13099], [13100], [13101], [13102], [13103], [13104], [13105], [13106], [13107], [13108], [13109], [13110], [13111], [13112], [13113], [13114], [13115], [13116], [13117], [13118], [13119],

[13120], [13121], [13122], [13123], [13124], [13125], [13126], [13127], [13128], [13129], [13130], [13131], [13132], [13133], [13134], [13135], [13136], [13137], [13138], [13139], [13140], [13141], [13142], [13143], [13144], [13145], [13146], [13147], [13148], [13149], [13150], [13151], [13152], [13153], [13154], [13155], [13156], [13157], [13158], [13159], [13160], [13161], [13162], [13163], [13164], [13165], [13166], [13167], [13168], [13169], [13170], [13171], [13172], [13173], [13174], [13175], [13176], [13177], [13178], [13179], [13180], [13181], [13182], [13183], [13184], [13185], [13186], [13187], [13188], [13189], [13190], [13191], [13192], [13193], [13194], [13195], [13196], [13197], [13198], [13199], [13200], [13201], [13202], [13203], [13204], [13205], [13206], [13207], [13208], [13209], [13210], [13211], [13212], [13213], [13214], [13215], [13216], [13217], [13218], [13219], [13220], [13221], [13222], [13223], [13224], [13225], [13226], [13227], [13228], [13229], [13230], [13231], [13232], [13233], [13234], [13235], [13236], [13237], [13238], [13239], [13240], [13241], [13242], [13243], [13244], [13245], [13246], [13247], [13248], [13249], [13250], [13251], [13252], [13253], [13254], [13255], [13256], [13257], [13258], [13259], [13260], [13261], [13262], [13264], [13265], [13266], [13267], [13269], [13270], [13271], [13272], [13274], [13275], [13276], [13277], [13278], [13279], [13280], [13281], [13283], [13284], [13285], [13286], [13287], [13289], [13290], [13291], [13292], [13293], [13294], [13295], [13296], [13297], [13298], [13299], [13300], [13301], [13302], [13303], [13304], [13305], [13306], [13307], [13308], [13309], [13310], [13311], [13312], [13313], [13314], [13315], [13316], [13317], [13318], [13319], [13320], [13321], [13322], [13323], [13324], [13325], [13326], [13327], [13328], [13329], [13330], [13331], [13332], [13333], [13334], [13335], [13336], [13337], [13338], [13339], [13340], [13341], [13342], [13343], [13344], [13345], [13346], [13347], [13348], [13349], [13350], [13351], [13352], [13353], [13354], [13355], [13356], [13357], [13358], [13359], [13360], [13361], [13362], [13363], [13364], [13365], [13366], [13367], [13368], [13369], [13370], [13371], [13372], [13373], [13374], [13375], [13376], [13377], [13378], [13379], [13380], [13381], [13382], [13384], [13385], [13386], [13387], [13388], [13389], [13390], [13391], [13392], [13393], [13394], [13396], [13397], [13398], [13400], [13401], [13402], [13403], [13404] — ΣN=9336525

1) Introduction

Obsessive-compulsive disorder (OCD) is a complex and often debilitating neuropsychiatric condition characterized by intrusive thoughts, images, or urges (obsessions) and repetitive mental or physical acts (compulsions) aimed at reducing distress or preventing a feared event. The manifestations of

OCD are diverse, ranging from classic contamination fears and checking rituals to more nuanced presentations like relationship OCD (ROCD) or scrupulosity [15, 325, 1686, 243]. The disorder impacts individuals across the lifespan, from childhood to older adulthood, and is frequently comorbid with other psychiatric and neurological conditions, complicating diagnosis and treatment [37, 21, 5038, 542, 981]. Recent research continues to unravel the multifaceted nature of OCD, exploring its neurobiological underpinnings, genetic predispositions, psychological mechanisms, and the efficacy of various therapeutic interventions. This paper synthesizes current findings to provide a comprehensive overview of the evolving landscape of OCD research.

2) Aim

This paper aims to systematically review and synthesize recent academic literature on obsessive-compulsive disorder, identifying key themes in its prevalence, etiology, neurobiology, clinical phenomenology, comorbidities, and therapeutic advancements, to highlight current understanding and future research directions.

3) Methods

Systematic review with multilayer AI research agent: keyword normalization, retrieval & structuring, and paper synthesis (see SAIMSARA About section for details).

- **Bias:** Qualitatively inferred from study design fields. The included studies predominantly comprise cohort studies (many without specified directionality), mixed-design studies, and randomized controlled trials (RCTs), with fewer cross-sectional or case-control designs. The lack of explicit directionality in many cohort studies and the reliance on cross-sectional designs in some prevalence studies limit causal inference. Small sample sizes in several intervention studies and case reports also introduce potential for bias and limit generalizability.

4) Results

4.1 Study characteristics

The review encompassed a wide array of study designs, including numerous cohort studies (e.g., [10, 11, 13, 14, 15, 19, 21, 27, 32, 33, 35, 36, 37, 38, 41, 42, 45, 50, 53, 59, 91, 96, 137, 165, 195, 196, 198, 199, 202, 206, 207, 213, 216, 223, 224, 225, 226, 230, 233, 235, 239, 243, 249, 250, 256, 258, 270, 273, 279, 282, 285, 313, 314, 323, 325, 326, 346, 353, 362, 363, 376, 378, 389, 392, 394, 405, 425, 444, 450, 454, 460, 462, 463, 471, 542, 558, 566, 570, 653, 664, 666, 714, 779, 791, 792, 799, 832, 835, 851, 874, 896, 909, 924, 934, 946, 951, 981, 986, 992, 1001, 1011, 1033, 1043, 1102, 1124, 1178, 1182, 1191, 1232, 1251, 1254, 1267, 1270, 1278, 1294, 1302, 1306, 1323, 1339, 1367, 1380, 1381, 1389, 1391, 1392, 1393, 1401, 1404, 1416, 1417, 1420, 1421, 1431, 1432, 1433, 1437,

1462, 1466, 1468, 1480, 1481, 1491, 1492, 1493, 1497, 1513, 1515, 1528, 1533, 1555, 1560, 1580, 1583, 1600, 1607, 1612, 1616, 1641, 1642, 1646, 1655, 1659, 1675, 1686, 1689, 1696, 1700, 1703, 1705, 1710, 1720, 1727, 1729, 1742, 1751, 1763, 1777, 1781, 1782, 1786, 1789, 1815, 1817, 1818, 1838, 1839, 1848, 1850, 1873, 1876, 1877, 1878, 1885, 2040, 2041, 2043, 2046, 2048, 2050, 2052, 2054, 2055, 2056, 2069, 2071, 2073, 2077, 2081, 2083, 2085, 2088, 2089, 2090, 2094, 2095, 2096, 2097, 2098, 2112, 2119, 2131, 2132, 2133, 2159, 2170, 2250, 2287, 2288, 2315, 2321, 2322, 2344, 2459, 2493, 2500, 2557, 2602, 2610, 2672, 2688, 2694, 2699, 2701, 2705, 2712, 2714, 2715, 2717, 2719, 2722, 2726, 2736, 2741, 2746, 2750, 2756, 2774, 2784, 2807, 2809, 2812, 2818, 2843, 2845, 2849, 2871, 2873, 2881, 2882, 2883, 2889, 2897, 2901, 2908, 2912, 2917, 2922, 2929, 2932, 2940, 2947, 2949, 2968, 2970, 2980, 2995, 2996, 3001, 3002, 3013, 3031, 3035, 3037, 3050, 3054, 3067, 3072, 3079, 3101, 3152, 3157, 3159, 3163, 3164, 3173, 3177, 3181, 3185, 3187, 3189, 3198, 3201, 3207, 3209, 3210, 3212, 3213, 3219, 3225, 3229, 3258, 3262, 3277, 3285, 3289, 3293, 3294, 3311, 3313, 3330, 3334, 3336, 3338, 3340, 3347, 3366, 3383, 3388, 3391, 3399, 3403, 3414, 3549, 3559, 3562, 3566, 3646, 3659, 3668, 3672, 3694, 3724, 3758, 3808, 3883, 3949, 3958, 4001, 4002, 4032, 4039, 4045, 4046, 4065, 4104, 4122, 4126, 4162, 4166, 4250, 4263, 4282, 4291, 4304, 4326, 4344, 4370, 4372, 4380, 4392, 4410, 4424, 4431, 4449, 4455, 4474, 4498, 4503, 4508, 4516, 4595, 4637, 4638, 4712, 4832, 4836, 4865, 4872, 4973, 5038, 5069, 5185, 5191, 5220, 5241, 5249, 5256, 5261, 5352, 5369, 5372, 5373, 5397, 5427, 5437, 5448, 5455, 5496, 5498, 5509, 5553, 5555, 5559, 5560, 5576, 5591, 5618, 5633, 5649, 5652, 5757, 5775, 5783, 5790, 5841, 5897, 5978, 5990, 6026, 6028, 6093, 6104, 6112, 6120, 6173, 6178, 6189, 6217, 6254, 6256, 6260, 6294, 6305, 6308, 6363, 6502, 6587, 6637, 6709, 6711, 6719, 6723, 6735, 6737, 6740, 6750, 6776, 6825, 6831, 6845, 6847, 6868, 6871, 6889, 6895, 6897, 6908, 6918, 6923, 6935, 6958, 6963, 6979, 6992, 7029, 7041, 7054, 7056, 7057, 7091, 7107, 7123, 7178, 7195, 7200, 7210, 7227, 7231, 7239, 7374, 7434, 7479, 7506, 7544, 7546, 7826, 7830, 8048, 8060, 8064, 8083, 8089, 8090, 8091, 8092, 8094, 8098, 8111, 8119, 8123, 8182, 8219, 8230, 8235, 8250, 8257, 8273, 8287, 8327, 8336, 8337, 8373, 8385, 8417, 8428, 8436, 8519, 8542, 8548, 8607, 8613, 8655, 8672, 8699, 8716, 8775, 8780, 8781, 8803, 8820, 8838, 8846, 8904, 9100, 9238, 9319, 9385, 9409, 9421, 9430, 9433, 9442, 9498, 9506, 9516, 9565, 9575, 9577, 9588, 9600, 9626, 9745, 9812, 9814, 9827, 9833, 9836, 9870, 9875, 9895, 9906, 9913, 9926, 9930, 9953, 9954, 9962, 9987, 10022, 10063, 10090, 10094, 10115, 10128, 10156, 10187, 10208, 10227, 10267, 10467, 10488, 10496, 10517, 10668, 10719, 10729, 10736, 10756, 10763, 10765, 10767, 10831, 10869, 10930, 10948, 10952, 11074, 11094, 11125, 11164, 11177, 11182, 11193, 11214, 11284, 11285, 11291, 11379, 11395, 11398, 11415, 11476, 11494, 11506, 11520, 11554, 11570, 11582, 11636, 11644, 11666, 11722, 11736, 11803, 11819, 11826, 11841, 11850, 11872, 11992, 11993, 11999, 12053, 12091, 12094, 12108, 12199, 12215, 12217, 12262, 12281, 12301, 12316, 12321, 12330, 12395, 12423, 12428, 12459, 12481, 12484, 12568, 12574, 12580, 12604, 12611, 12628, 12653, 12679, 12729, 12756, 12793, 12828, 12879, 12911, 12932, 12939, 12991, 13004, 13042, 13085, 13127, 13146, 13167, 13240, 13265, 13270, 13296, 13355, 13360, 13381)), randomized controlled trials (RCTs) (e.g., [53, 59, 225, 258, 270, 279, 376, 378, 454, 471, 5369,

5427, 779, 9238, 9319, 9430, 9913, 9930, 9987, 10094, 10115, 10128, 11125, 13240]), cross-sectional studies (e.g., [6, 542, 2949, 2968, 3173, 3185, 5990, 8048, 8094, 8273, 9565, 9575, 9954, 9962, 10227, 10496, 11554, 12091, 12281, 12484, 12568, 12679]), and case-control studies (e.g., [41, 45, 198, 202, 2784, 3152, 4595, 5241, 8089, 11094, 11415, 12939, 12991]). Populations studied ranged from general adults and youth to specific clinical groups such as pregnant women, individuals with Tourette syndrome (TS), autism spectrum disorder (ASD), anorexia nervosa (AN), multiple sclerosis (MS), and treatment-resistant OCD. Follow-up periods varied widely, from immediate post-treatment assessments to 7-year longitudinal observations, with many studies reporting no specific follow-up.

4.2 Main numerical result aligned to the query

The prevalence of obsessive-compulsive disorder (OCD) in various populations exhibits considerable variability. Among general populations or specific at-risk groups, the reported prevalence for OCD symptoms or diagnosis ranges from 2.2% in indigenous tribal adolescents [2968] to 93.6% in postpartum women [986]. More specific prevalence figures include 2.5% in Jeddah, Saudi Arabia [5352], 2.8% in the WHO Eastern Mediterranean Region [6897], 2.9% in Singapore adults [8048], 3.9% among university medical employees [3207], 8.4% for incident OCD cases in pregnant women [21], 8.6% for onychophagia in OCD patients [6], 9.1% among middle school students in China [3338], 10.7% in people with multiple sclerosis (PwMS) [32], 13% in individuals with functional constipation [4410], 13.3% for broad OCD in US adolescents [2602], 15.1% in systemic sclerosis patients [5990], and 28% among medical and health science students [542]. The median reported prevalence of OCD across these diverse populations is approximately 9.1% [3338]. This wide range reflects differences in study populations, diagnostic criteria, and assessment methods.

4.3 Topic synthesis

- **Comorbidity with Autism Spectrum Disorder (ASD):** Onychophagia (nail-biting) in OCD patients is highly associated with ASD (96.2% vs. 18.0% in OCD-only) [6]. ASD is frequently comorbid with OCD, with 9% prevalence in autistic populations [9442] and shared repetitive behaviors [2056, 6719, 7830].
- **OCPD Traits and OCD Severity:** Pathological obsessive-compulsive personality disorder (OCPD) traits positively correlate with OCD symptom severity ($r = 0.42$, $p < .001$) and the number of obsessive-compulsive related disorder (OCRD) symptom domains ($r = 0.39$, $p < .001$) [11]. OCPD diagnosis can be unstable over time [35].
- **Neurobiological Abnormalities:** OCD is characterized by widespread functional connectivity density abnormalities within and beyond the cortico-striatal-thalamic loop [13, 653], abnormal spontaneous white matter neural activity [14], and distinct EEG microstate patterns [19, 27]. Structural alterations in the orbitofrontal cortex (OFC) and insula are

associated with illness severity [199, 1043, 11285, 799].

- **Neurological Comorbidities:** OCD has an increased prevalence in people with multiple sclerosis (10.7%, OR = 3.25) [32, 2940], Huntington's disease [5038], and is associated with delayed walking acquisition in chronic tic disorders (OR: 1.01-1.27) [1528]. Focal epilepsy shows a significant genetic causality with OCD (OR, 1.44) [3152].
- **Psychotic Symptoms and Health Impact:** Psychotic symptoms fully mediate the relationship between compulsions and health in individuals with OCD, with high prevalence of positive (53.9%), negative (74.7%), and depressive (83.5%) psychotic symptoms [33]. Comorbid OCD is found in 13.5% of clinical high-risk for psychosis samples [2098], and OCD-like symptoms can be early warning signs for psychosis [9953].
- **Relationship Obsessive-Compulsive Disorder (ROCD):** Married women with ROCD experience marital difficulties due to chronic doubt, emotional dysregulation, and maladaptive coping [15]. Dyadic interaction patterns can exacerbate ROCD symptoms [243].
- **Technology as Trigger and Coping Tool:** Adults with OCD describe technology as both a trigger and a coping tool, with features like notifications and complex user interfaces reinforcing compulsive behaviors [10]. Smartphone apps are top choices for self-management [165].
- **Perinatal OCD:** A significant proportion of pregnant women (8.4%) experience OCD onset during pregnancy and postpartum, with socioeconomic and psychological vulnerabilities increasing risk [21, 1404, 8091]. Birth trauma was not significantly associated with OCD risk in postpartum women [986].
- **Genetic and Epigenetic Factors:** Genome-wide analyses identified 30 independent loci associated with OCD, with genetic risk shared with many other psychiatric disorders [206, 3883]. Rare variants in KCNC/MKNK1-AS1 overlap region are associated with OCD [314]. Differentially methylated regions (DMRs) are associated with OCD diagnosis [909]. Polygenic scores for AN and OCD are linked to lower adverse perinatal events [1432].
- **Inflammation and Gut Microbiota:** Evidence supports gut microbiota as a modifiable co-factor in OCD, with reduced short-chain fatty acid capacity and pro-inflammatory pathways [195, 5897, 3258]. TH22 immunity is related to OCD [714]. Neuroinflammation is implicated in OCD [1232, 2741, 6093].
- **Cognitive and Emotional Dysregulation:** OCD patients exhibit higher impulsivity and maladaptive cognitive emotion regulation strategies [41], impaired planning and problem-solving [570], and biased attention towards stimuli associated with compulsive acts [832]. Alexithymia is significantly higher in OCD patients and associated with impaired sexual functioning and dyadic adjustment [45, 224]. Intolerance of uncertainty is a transdiagnostic vulnerability [1178, 5591, 2094].
- **Treatment Modalities - Psychotherapy:**

- **Exposure and Response Prevention (ERP):** VC ERP shows significant, persistent reductions in YBOCS scores, comparable to in-person ERP [36]. Parent training in ERP is an innovative approach for pediatric OCD [91]. Leaning into anxiety during ERP tasks predicts symptom improvement [460, 2901]. ERP combined with SSRIs is more effective than SSRI-only in adolescents [53]. Pavlovian fear reversal learning predicts ERP response [230]. Psychological interventions have large average effects ($g = 1.18$) [1839].
- **Cognitive Behavioral Therapy (CBT):** Digital sensor-assisted CBT reduces symptoms with high satisfaction [42]. ICBT is sought due to lack of access or previous unhelpful face-to-face treatment [450, 3294]. VERP is safe with fewer side effects than usual care [454]. CBT improves task control deficits [462]. Family-based CBT is effective for pediatric OCD [279]. Transdiagnostic CBT is effective [6173].
- **Acceptance and Commitment Therapy (ACT):** Group-delivered ACT is non-inferior to CBT+ERP in reducing OCD symptoms [376]. ACT combined with ERP is effective, with adaptation protocols for cultural contexts [394, 6908].
- **Other Psychotherapies:** Chairwork-based interventions show efficacy [1011]. Mindfulness- and acceptance-based programs (MABPs) show large reductions in OCD severity, comparable to CBT/ERP [363]. Farm-based therapy may improve OCD symptoms [924].
- **Treatment Modalities - Pharmacotherapy:**
- **SSRIs:** SSRIs are cornerstone treatments [835]. Lower α ALFF in the sensory-motor area (SMA) predicts SSRI response [249]. Fluoxetine is effective in child and adolescent OCD [11841]. Antidepressants are prescribed to 55% of pediatric OCD patients [353]. Antidepressants are associated with an increased risk of OCD [1555].
- **Augmentation Strategies:** Brexpiprazole augmentation to SRIs shows significant symptom reduction in treatment-resistant OCD [273]. Lurasidone and fluvoxamine combination shows rehabilitation effects in AN-r with comorbid OCD [96]. Quetiapine monotherapy is beneficial for bipolar depression with comorbid OCD [2050]. Cariprazine add-on therapy rapidly resolves OCD symptoms in schizophrenia patients [2055, 5559]. Ondansetron augmentation to SRIs reduced overall OCD severity [2131]. Vortioxetine monotherapy shows preliminary efficacy in SSRI-resistant OCD [1655].
- **Novel Pharmacotherapies:** Psilocybin produces rapid, clinically meaningful, and sustained reductions in treatment-resistant OCD [779, 326, 5576, 7546, 10831]. Ketamine shows potential for treatment-resistant OCD [1877, 4516]. Saffron is as effective as fluvoxamine for mild-to-moderate OCD [3210]. Medicinal cannabinoid-rich cannabis (NTI164) improved OCD in children with PANS [951]. Evidence for medicinal cannabis in treating OCD is inconclusive [1380, 6502].
- **Neuromodulation:**
- **Deep Brain Stimulation (DBS):** DBS of the VC/VS region leads to rapid symptom improvement in OCD [50, 285]. Pre-treatment connectome characteristics predict treatment

response [1302]. DBS is effective for severe, treatment-refractory OCD, with a decrease of 5.1 YBOCS points compared to sham [285, 2871, 7178, 10763, 10267, 9600, 9836, 11291, 3277]. Robot-assisted stereotaxy shows high accuracy for DBS lead placement [5455]. DBS increases BMI in patients with AN and OCD [3225]. Personalized stimulation sites can be identified using sEEG [2287].

- **Transcranial Magnetic Stimulation (TMS):** Pretreatment parietal beta power bands predict dTMS response in treatment-resistant OCD [202]. Low-frequency rTMS to the right dlPFC is being assessed [270, 4002]. Single-session inhibitory TMS reduces compulsions [2096]. rTMS leads to reorganization of brain functional networks [3189, 3403].
- **Transcranial Direct Current Stimulation (tDCS):** Early augmentation with tDCS rapidly reduces symptom severity [225]. Dual-site cathodal tDCS over OFC and pre-SMA shows promise [471]. tDCS may reduce Y-BOCS scores, especially with ≤ 20 days treatment [346]. Intensified tDCS over the right inferior frontal cortex showed limited efficacy [2701]. Online tDCS to pre-SMA reduces disgust sensitivity [2085].
- **Other Neurosurgical Interventions:** Gamma knife capsulotomy is effective for refractory OCD [4712]. Limbic leukotomy provides substantial benefit for severe OCD [12604]. High-intensity focused ultrasound (FUS) lesioning shows promise [1533]. Endoscopic interhemispheric bilateral anterior cingulotomy is used for OCD [8417].
- **Impact on Family and Social Life:** Family accommodation (FA) is pervasive in OCD, occurring in over 90% of cases [196]. OCD indirectly impacts family members, often leading them to seek medical attention [239]. OCD is the most trivialized mental health condition on social media [8780].
- **Diagnostic Challenges and Misdiagnosis:** Over one-third of psychologists incorrectly diagnose OCD vignettes, impacting treatment recommendations [198]. Bipolar disorder is commonly misdiagnosed as OCD [9814]. Scepticism regarding online presentations of psychiatric disorders is common for OCD [1033].
- **Cognitive Inflexibility and Reward/Punishment Sensitivity:** OCD patients show impaired performance on reversal learning tasks [9506, 462], and poor behavioral adaptation to changing reinforcement-punishment contingencies, with greater sensitivity to punishment under uncertainty [1401]. Deletion of 5-HT_{3A} receptor enhances cognitive flexibility in mice [1191].
- **Suicidality:** OCD symptoms are strongly correlated with suicidal ideation [2132, 2970, 7826]. Psychotic symptoms fully mediate the relationship between compulsions and health, including suicidality [33]. Pre-existing mental health disorders, including OCD, increase the speed of transition from suicidal ideation to plans/attempts [5649].
- **Childhood and Adolescent OCD:** Children with OCD demonstrate marked domain-specific functional impairments, particularly during school, after school, and nighttime routines [37]. Early-onset OCD may be a distinct subtype with glutamatergic imbalance [1616]. Early

intervention protocols aim to reduce chronicity [223, 4263]. Pediatric OCD patients tolerate lower doses of antidepressants/antipsychotics due to side effects [7091].

- **Co-occurring Behaviors and Conditions:**
- **Body-Focused Repetitive Behaviors (BFRBs):** Onychophagia is present in 8.6% of OCD patients [6]. Bruxism is more frequent in OCD patients [558, 235]. Trichotillomania (TTM) patients have a significantly higher risk of subsequent OCD diagnoses [1710] and shares features with OCD [1417, 3949, 7544, 13042].
- **Eating Disorders (EDs):** OCD is a common comorbidity in young people with Anorexia Nervosa (AN) and Atypical Anorexia Nervosa (AAN) [1270, 1389, 3002, 3388, 6256, 12301, 12481]. Lack of identity predicts OCPD traits in female ED patients [1124]. Orthorexia nervosa shares traits with OCD [1878, 4973, 8064]. OCD symptoms related to symmetry, checking, and aversion to dirt/germs predict ED symptoms [8542].
- **Tourette Syndrome (TS):** OCD is a significant predictor of increased tic severity [1254, 4162, 4065, 8219]. Comorbid ADHD and OCD influence long-term adaptive outcomes in TS [11992].
- **Sleep Disorders:** Poor sleep quality is associated with probable OCD [542]. REM sleep deprivation in rats leads to OCD-like behaviors [2159]. Phase angle between dim light melatonin onset and sleep midpoint is associated with OCD symptom severity [3724]. Burn survivors with new sleep disorders have increased OCD risk [1339].
- **Addictive Behaviors:** Problematic gaming is associated with OCD [7029]. Smartphone addiction is linked to higher OCD scores [3808, 4455, 1560]. Obsessive-compulsive personality traits show a heterogeneous relationship with gambling severity [1781, 8094, 9498, 11164, 5397].
- **Public Perception and Stigma:** OCD received higher "true self" ratings compared to other severe mental disorders [1392, 1393]. It is among the least stigmatized diagnoses [4032] but also among the most trivialized on social media [8780]. Belief in a symptom continuum reduces desire for social distance [9954].
- **Biomarkers and Predictive Factors:** Resting-state EEG-derived sensorimotor network alterations in theta and high alpha bands are candidate biomarkers [27]. Alterations in miR-132 and miR-125b-5p expression, and higher serotonin levels, are promising biomarkers [226]. Pretreatment parietal beta power bands predict dTMS response [202]. Structural-functional multilayer network properties predict rTMS outcome [233]. Regional vulnerability index (RVI) differentiates OCD patients from controls and correlates with symptoms [425].
- **COVID-19 Impact:** Remote mental healthcare maintained treatment efficacy for OCD during the pandemic [1583, 6294, 8235]. OCD symptoms increased in young subjects during the pandemic [2089]. COVID-19 infection was associated with a higher prevalence of OCD symptoms [2996, 5555]. Primary care contacts for OCD dropped during restrictions [6871]. Anxiety, depressive disorders, and OCD increased in psychiatric emergency department

admissions during the pandemic [3229, 8803].

- **Transdiagnostic Features:** Amygdala functional connectivity alterations converge across major psychiatric disorders, including OCD [792]. Intolerance of uncertainty and negative problem orientation are transdiagnostic vulnerabilities [1178]. Cognitive biases are transdiagnostic, with OCD showing the highest severity for interpretation biases [4039, 3668]. Increased frequency of involuntary memories is a transdiagnostic phenomenon [1838]. Midfrontal theta activity is a neural index of cognitive control differing in psychiatric conditions with cognitive control deficiencies, including OCD [5496].
- **Specific OCD Presentations:** Religious content obsessions in young men can be typified into three forms [325, 10952]. Scrupulosity is a pediatric OCD symptom dimension [1686]. Suicidal obsessions in OCD differ from suicidal ideation [1703]. Contamination-based OCD involves higher contamination ratings and looming vulnerability [2715, 3164].
- **Early Onset and Risk Factors:** Lower socioeconomic status, lower IQ, younger age, maternal stress during pregnancy, absence of breastfeeding, and parental/youth baseline OCS predict higher follow-up OCS [7374]. Failing early educational transitions increases OCD risk [4001]. Prenatal exposure to maternal autoimmune diseases increases offspring OCD risk [6735]. Cesarean delivery is associated with increased odds of OCD [8385].
- **Other Comorbidities:** OCD is comorbid with myofascial pain dysfunction syndrome (MPDS) [235], Sjögren's syndrome (HR 3.31) [2088], and higher rates in patients with severe acne treated with systemic therapies [1817]. Women with bipolar disorder have a higher prevalence of comorbid OCD [874]. First-degree relatives of TRD patients have increased OCD risk (aRR 3.14) [3366]. Genetic predisposition to fatty liver disease is associated with increased OCD risk [2881].
- **AI and Digital Health:** AI technologies offer transformative potential for early detection and treatment enhancement in OCD [216]. Automated classification systems can accurately label exposure and encourage events in pediatric OCD therapy sessions [1642]. Large language models (LLMs) show potential in providing accurate responses to OCD queries [4508].

5) Discussion

5.1 Principal finding

The synthesis of recent research reveals a median prevalence of 9.1% for obsessive-compulsive disorder (OCD) across diverse populations, highlighting its significant presence in both general and specific at-risk groups [3338]. This figure underscores the widespread impact of OCD, which often presents with complex comorbidities and varied clinical manifestations.

5.2 Clinical implications

- **Early Detection and Screening:** Given the significant prevalence and impact of OCD, especially in vulnerable populations like pregnant women [21], youth [37], and those with other psychiatric or neurological conditions [32, 542], routine screening for OCD symptoms should be integrated into primary care and specialized medical settings.
- **Tailored Treatment Approaches:** The heterogeneity of OCD, including specific presentations like ROCD [15], scrupulosity [1686], and contamination fears [2715], necessitates personalized treatment plans. Combined interventions, such as ERP with SSRIs [53] or novel psychotherapies like ACT [376], should be considered, alongside neuromodulation for treatment-resistant cases [779, 285].
- **Addressing Comorbidity:** The high rates of comorbidity with conditions like ASD [6], OCPD [11], eating disorders [1270], and psychotic symptoms [33] demand a transdiagnostic and multidisciplinary approach to care. Clinicians should be vigilant for co-occurring disorders to optimize treatment outcomes and address overall patient health.
- **Leveraging Technology:** Technology can be both a trigger and a coping tool for OCD [10]. Integrating digital health solutions, such as smartphone apps for self-management [165] and videoconferencing-delivered therapy [36, 6711], can enhance accessibility and support, particularly for pediatric patients via parent training [91].
- **Suicide Risk Mitigation:** The strong correlation between OCD symptoms and suicidal ideation [2132, 7826], especially when comorbid with psychotic symptoms [33] or other mental health disorders [5649], emphasizes the critical need for comprehensive suicide risk assessment and intervention strategies within OCD treatment protocols.

5.3 Research implications / key gaps

- **Long-term Efficacy of Novel Therapies:** While psilocybin [779] and ketamine [1877] show promise for treatment-resistant OCD, long-term efficacy and safety data are limited, warranting further prospective RCTs with extended follow-up periods.
- **Biomarker Validation for Treatment Response:** Research on neurophysiological (e.g., EEG microstates [19, 27], ERN [38, 1462]) and genetic/epigenetic biomarkers (e.g., miR-132 [226], DMRs [909]) needs validation in larger, diverse cohorts to predict treatment response and guide personalized interventions.
- **Mechanisms of Digital Interventions:** The specific mechanisms by which technology-based interventions (e.g., digital CBT [42], AI-enhanced therapy [216]) impact OCD symptoms require further investigation, possibly through process-based studies evaluating cognitive and behavioral changes.
- **Impact of Sociocultural Factors:** The influence of factors like residential mobility [6847], cultural context [394, 664], and stigma [8780, 9954] on OCD presentation, help-seeking,

and treatment outcomes needs more robust, culturally sensitive research, particularly in understudied regions [2968, 6897].

- **Neuroinflammation and Gut-Brain Axis:** The role of neuroinflammation [1232, 714] and gut microbiota [195, 5897] in OCD pathophysiology requires further elucidation through longitudinal studies and interventional trials targeting these pathways.

5.4 Limitations

- **Study Design Heterogeneity** — The diverse study designs, including cross-sectional and cohort studies, limit causal inferences.
- **Varied Sample Sizes** — Small sample sizes in many intervention studies restrict generalizability.
- **Inconsistent Outcome Measures** — Different scales and metrics for symptom severity hinder direct comparison across studies.
- **Lack of Long-Term Follow-up** — Many studies lack extended follow-up, limiting understanding of long-term treatment effects.
- **Geographic and Demographic Bias** — Research may not fully represent global populations or diverse demographic groups.

5.5 Future directions

- **Longitudinal Studies on Etiology** — Conduct prospective longitudinal studies to clarify causal pathways and risk factors.
- **Standardized Biomarker Panels** — Develop and validate standardized neurobiological and genetic biomarker panels for diagnosis and treatment prediction.
- **AI-Driven Personalized Therapies** — Explore AI-driven adaptive interventions for real-time, personalized OCD treatment.
- **Culturally Adapted Interventions** — Develop and test culturally sensitive and accessible interventions for diverse populations.
- **Integrative Neuroimmune Research** — Investigate the interplay of neuroinflammation, genetics, and gut microbiota in OCD.

6) Conclusion

The current research landscape on obsessive-compulsive disorder is rich and diverse, highlighting its complex etiology, varied clinical presentations, and significant comorbidity burden. The median

prevalence of OCD across various populations is approximately 9.1%, underscoring its widespread impact. Advances in neurobiology reveal intricate brain network dysfunctions, while therapeutic innovations, from enhanced psychotherapies like ERP and ACT to neuromodulation techniques such as DBS and TMS, offer hope for improved outcomes. However, the field is limited by methodological heterogeneity and a lack of long-term follow-up in many studies. Future research should prioritize longitudinal studies to understand causal mechanisms, validate biomarkers for personalized treatment, and develop culturally sensitive, technology-enhanced interventions to address the global burden of OCD.

References

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Figure 1. Publication-year distribution of included originals

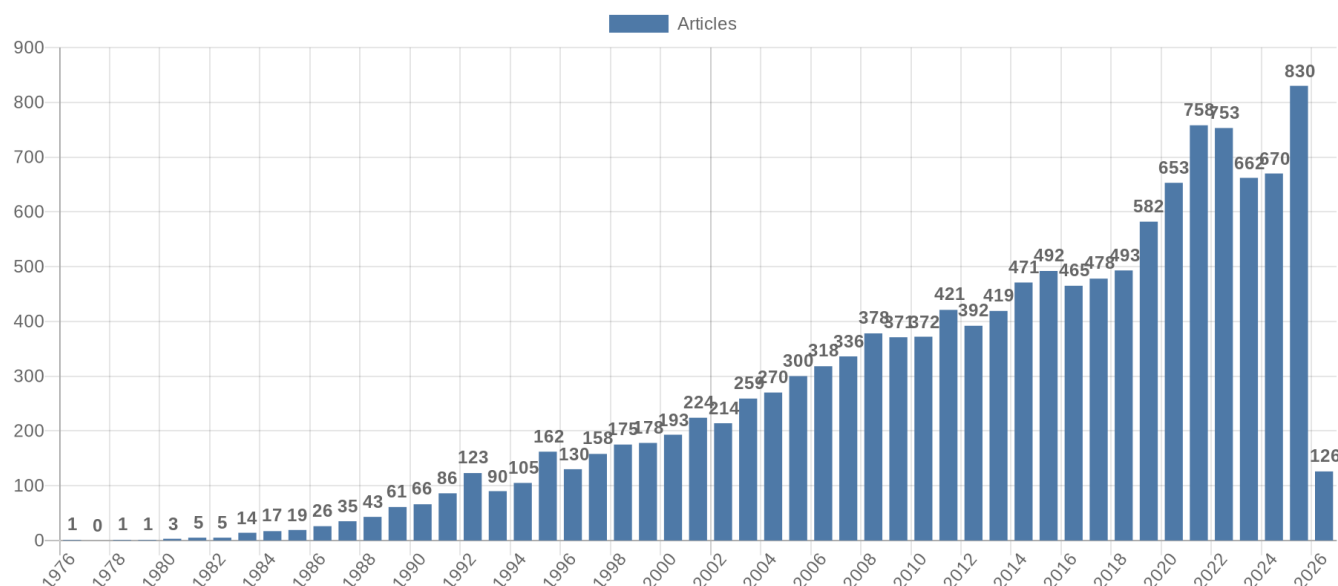


Figure 2. Study-design distribution of included originals

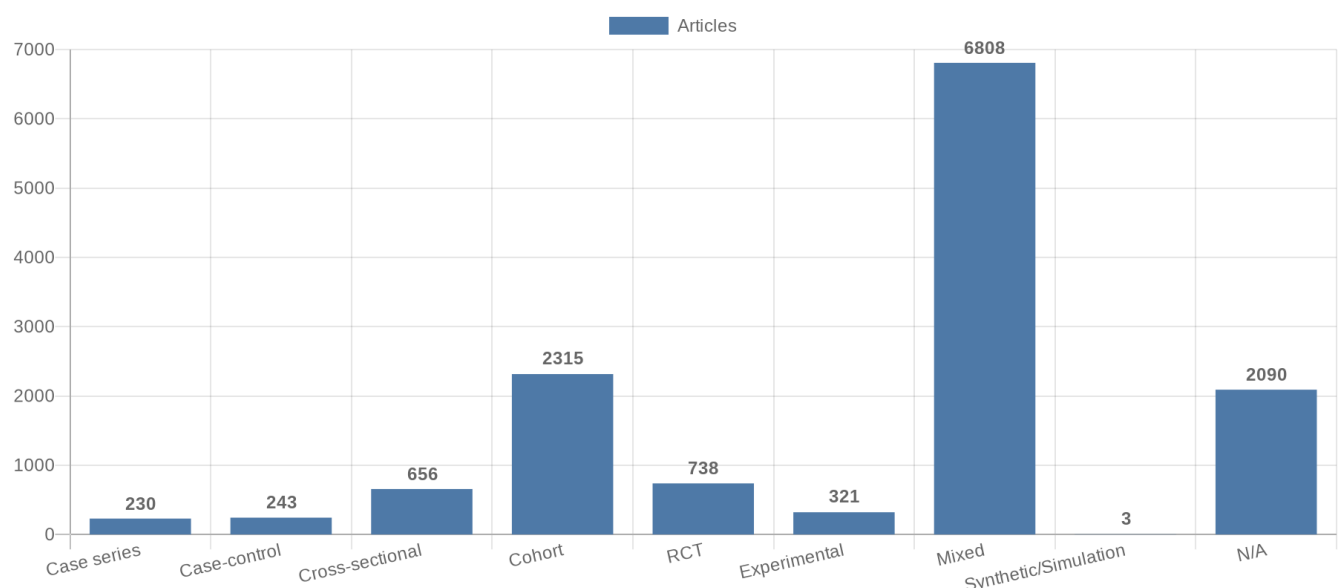


Figure 3. Study-type (directionality) distribution of included originals

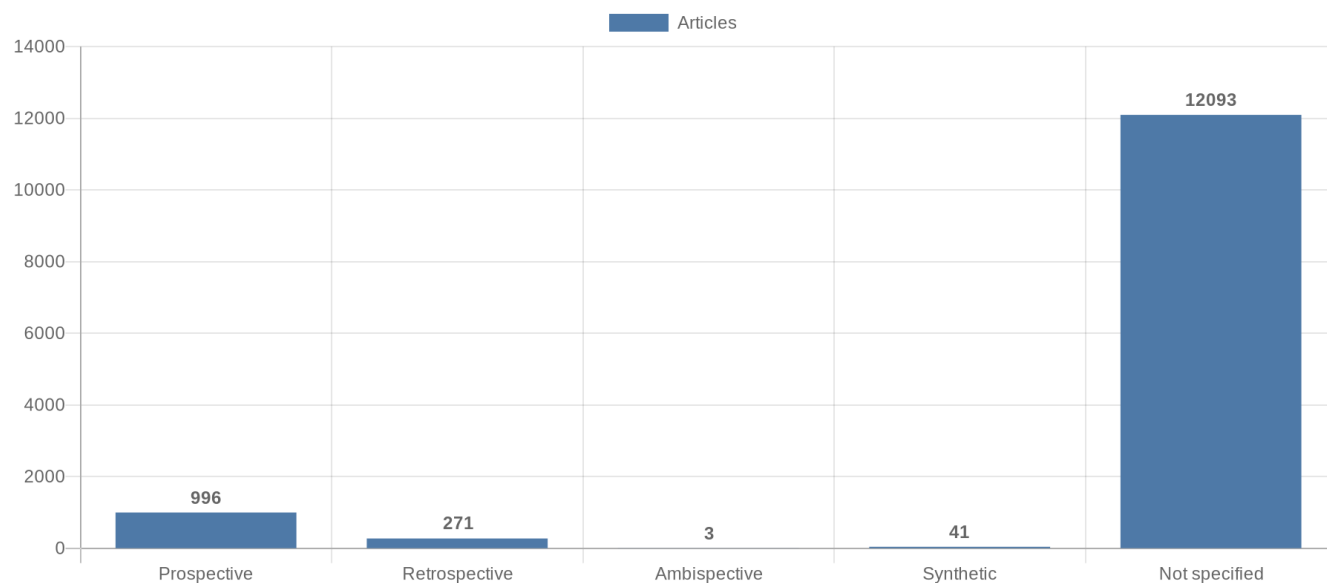


Figure 4. Main extracted research topics

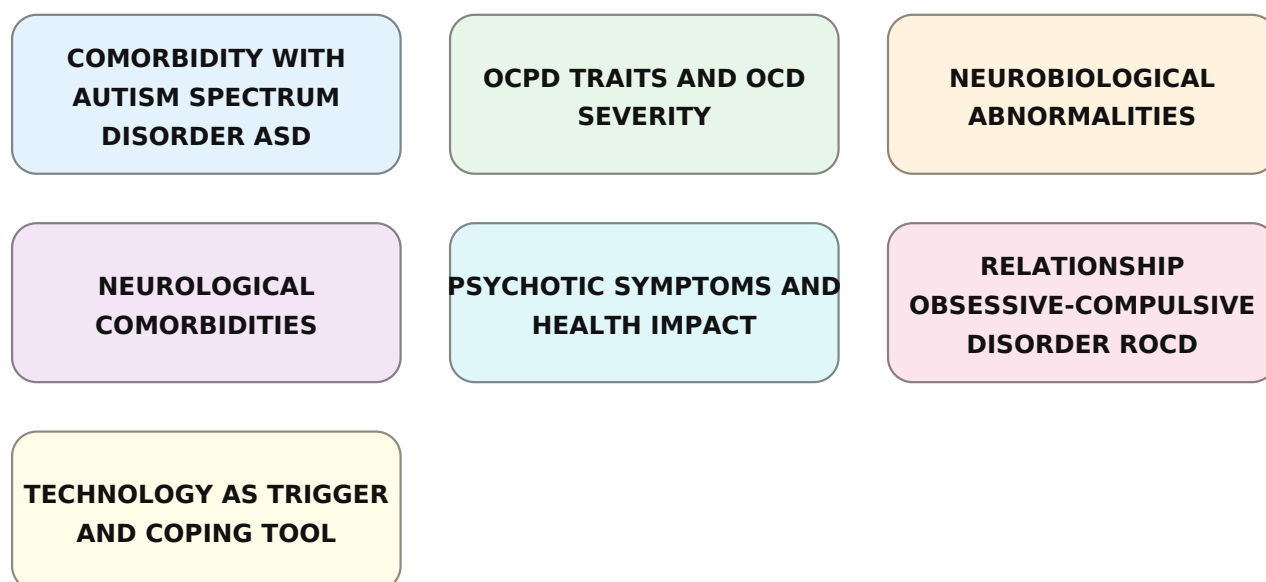


Figure 5. Limitations of current studies (topics)

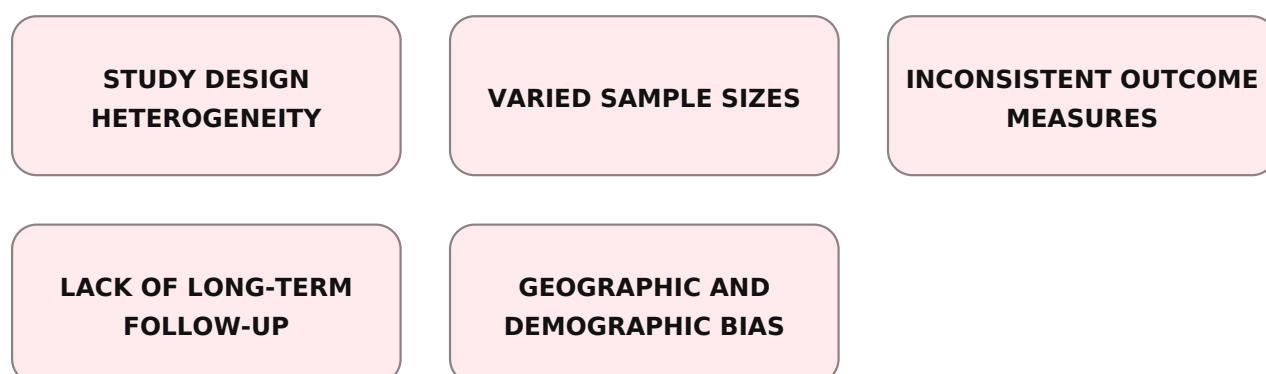


Figure 6. Future research directions (topics)

