DS1  Search strategy of the review

1. (behavio$ adj activati$).ti,ab.
2. (activity adj scheduling).ti,ab.
3. (pleasant event$ or pleasant activit$ or daily diar$).ti,ab.
4. (behavio$ adj therap$).ti,ab.
5. exp behavior therapy/
6. 1 or 2 or 3 or 4 or 5
7. exp Aged/
10. Senil*.mp.
11. Older.mp.
12. Old Age.mp.
13. Late Life.mp.
15. 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14
16. randomized controlled trial.pt.
17. controlled clinical trial.pt.
18. randomized.ab.
19. randomised controlled trial.tw.
20. random*.ab.
21. randomly.ab.
22. trial.ab.
23. groups.ab.
24. 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23
25. 6 and 15 and 24
Table DS1  Characteristics of included studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Method</th>
<th>Measures</th>
<th>Intervention</th>
<th>Outcome Data Timepoints</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA in older people living in the community (with depressive symptoms or a diagnosis of depression) vs TAU or other psychological intervention (one study only)</td>
<td></td>
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<tr>
<td>Gallagher &amp; Thompson 1982</td>
<td>n = 30</td>
<td>RCT</td>
<td>Primary outcome</td>
<td>BA (referred to as behaviour therapy) – Increasing pleasant events daily, monitoring of mood, relaxation &amp; social skills training</td>
<td>Outcome data included in the Review 3 months</td>
</tr>
<tr>
<td></td>
<td>Inclusion criteria</td>
<td></td>
<td></td>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) aged ≤ 55</td>
<td></td>
<td></td>
<td>16 individual sessions over 12 weeks (90 mins)</td>
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</tr>
<tr>
<td></td>
<td>2) MMSE ≤ 25</td>
<td></td>
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<tr>
<td></td>
<td>3) BDI &lt; 17/HRSD &lt; 17</td>
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</tr>
<tr>
<td>Thompson &amp; Gallagher 1984</td>
<td>n = 43</td>
<td>RCT</td>
<td>Primary outcome</td>
<td>BA (referred to as behaviour therapy) – Increasing pleasant events daily, monitoring of mood, relaxation &amp; social skills training</td>
<td>Outcome data included in the Review 6 weeks</td>
</tr>
<tr>
<td></td>
<td>Inclusion criteria</td>
<td></td>
<td></td>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) aged ≤ 60</td>
<td></td>
<td></td>
<td>16-20 individual sessions over 6 weeks</td>
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<tr>
<td></td>
<td>2) MDD (RDC)</td>
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<tr>
<td></td>
<td>6) MMSE ≤ 25</td>
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<tr>
<td>Scogin 1989</td>
<td>n = 40</td>
<td>RCT</td>
<td>Primary outcome</td>
<td>BA bibliotherapy (Control Your Depression – Lewinsohn et al), pleasant activity scheduling, learning to relax, social skills, modification of self-defeating thoughts</td>
<td>Outcome data included in the Review 4 weeks</td>
</tr>
<tr>
<td></td>
<td>Inclusion criteria</td>
<td></td>
<td></td>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) HRSD ≤ 10</td>
<td></td>
<td></td>
<td>Several ‘chapters’ over 4 weeks</td>
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<tr>
<td></td>
<td>2) MSQ ≤ 8</td>
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<td></td>
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<tr>
<td>Moss et al 2012</td>
<td>n = 26</td>
<td>RCT</td>
<td>Primary outcome</td>
<td>BA bibliotherapy (Addis &amp; Martell’s Overcoming depression one step at a time), pleasant activity scheduling and mood monitoring</td>
<td>Outcome data included in the Review 4 weeks</td>
</tr>
<tr>
<td></td>
<td>Inclusion criteria</td>
<td></td>
<td></td>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) aged ≤ 55</td>
<td></td>
<td></td>
<td>Self-paced course over 4 weeks</td>
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<tr>
<td></td>
<td>2) GDS ≤ 5</td>
<td></td>
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<tr>
<td></td>
<td>3) TICS-M ≤ 33</td>
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</tr>
<tr>
<td>Cernin 2009</td>
<td>n = 15</td>
<td>RCT</td>
<td>Primary outcome</td>
<td>Pleasant activities scheduling, monitoring of mood, controlled breathing, visual imagery (Lichtenberg et al.)</td>
<td>Outcome data included in the Review 3 months</td>
</tr>
<tr>
<td></td>
<td>Inclusion criteria</td>
<td></td>
<td></td>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Older adults living in assisted living housing</td>
<td></td>
<td></td>
<td>36 sessions over 12 weeks (lasting 30 minutes)</td>
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</tr>
</tbody>
</table>
### Multicomponent BA for older people in the community

**Ciechanowski 2004**  
**Inclusion criteria**  
1) aged ≤ 55  
2) DSM-IV minor depression or dysthymia  
**n = 138** (mostly homebound & medically ill)  
**Control group**  
TAU  
**Primary outcome**  
HSCL-20  
**RCT**  
PEARLS (Program to Encourage Active, Rewarding Lives for Seniors), medication review, increasing pleasant activities, monitoring of mood, PST, increasing physical and social activity  
**Duration**  
8 sessions over 19 weeks on average (of 50 minutes)  
**Outcome data included in the Review**  
6 & 12 months

**Unützer 2002**  
**Inclusion criteria**  
1) aged ≤ 60  
2) SCID major depression and/or dysthymia  
**n = 1801**  
**Control group**  
TAU  
**Primary outcome**  
SCL-20  
**RCT**  
IMPACT (Improving Mood-Promoting Access to Collaborative Care Treatment), care management, biopsychosocial history, pleasant activity scheduling, medication review and/or PST  
**Duration**  
Weekly contact for an average of 6-8 weeks  
**Outcome data included in the Review**  
3 & 12 months

**Gitlin et al. 2013**  
**Inclusion criteria**  
1) aged ≤ 55  
2) PHQ-9 ≤ 5  
3) MMSE ≤ 24  
**n = 208** (African Americans)  
**Control group**  
Wait-list control  
**Primary outcome**  
Depression severity  
PHQ-9  
**RCT**  
BTB (Beat the Blues) incorporating care management, pleasant activity goals, mood monitoring, addressing environmental barriers, stress reduction  
**Duration**  
10 in home sessions (1 hour) weekly  
**Outcome data included in the Review**  
4 & 8 months

**Gilbody et al. 2017**  
**Inclusion criteria**  
1) aged ≤ 65  
2) DSM-IV subthreshold depression (MINI)  
**n = 705**  
**Control group**  
Usual primary care  
**Primary outcome**  
Depression severity  
PHQ-9  
**RCT**  
CASPER (Collaborative Care for Screen Positive Elders) incorporating care management, pleasant activity scheduling, monitoring of mood and rewarding activities, addressing avoidance of social interactions  
**Duration**  
6 sessions (1 face to face and subsequent sessions by phone) weekly  
**Outcome data included in the Review**  
4 & 12 months

### BA in older people in inpatient settings

**Sood 2003**  
**Inclusion criteria**  
1) aged ≤ 60  
**n = 14** (inpatients of rehabilitation unit)  
**Control group**  
Standard occupational therapy  
**Primary outcome**  
Depression  
GDS  
**RCT**  
GWP (Geriatric Wellness Program), increasing pleasurable activities, mood monitoring, relaxation/stress reduction (controlled breathing, visualisation exercises)  
**Duration**  
Post intervention (no further details provided)  
**Outcome data included in the Review**
4 sessions weekly (30-60 minutes) over 7.5 weeks

Control group
Treatment as usual

Primary outcome
Depression
GDS

Intervention
BATD (Brief Behavioral Activation Therapy), monitoring of pleasant activities and mood, identifying life areas of improvement

Duration
8 group sessions over 2 weeks

Inclusion criteria
1) aged ≤ 65
2) GDS ≤ 9/TICS-m ≤ 20

Snarksi 2011
n = 50 (inpatients with mild/moderate cognitive impairment)

Control group
Treatment as usual

Primary outcome
Depression
GDS-S

Intervention
Increasing frequency and duration of activities in line with life goals, mood monitoring, setting goal hierarchies

Duration
8 sessions, biweekly (30-60 minutes) over 4 weeks

Inclusion criteria
1) aged ≤ 65
2) GDS-S ≤ 3
3) MMSE ≤ 18

ECT for older people living in care

Lichtenberg2005
n = 20 older people with AD or other dementia diagnosis

Control group
TAU

Primary outcome
Depression
GDS

Intervention
Increasing pleasant activities, mood monitoring, breathing relaxation/imagery exercises

Duration
3 times a week (20-30 minutes sessions) over 3 months

Meeks et al. 2008
n = 20

Control group
TAU

Primary outcome
Depression
HDRS

Intervention
BE-ACTIV (Behavioral Activities-based intervention), scheduling and increasing pleasant events, goal re-evaluation, confronting obstacles, maintaining gains

Duration
10 individual 30-40 minutes sessions weekly over 10 weeks

Inclusion criteria
1) SADS & DSM-IV major depressive disorder/minor depression/intermittent depressive disorder
2) GDS ≤ 11
3) MMSE < 13

Hyer et al., 2009
n = 25

Control group
Treatment as usual

Primary outcome
Depression
GDS-S

Intervention
GIST (Group, Individual and Staff Therapy), increasing positive mood through pleasant activities, goal setting, & social support

Duration
13 group & 2 individual sessions (75 to 90 minutes ) weekly over 13 weeks

Inclusion criteria
1) DSM-IV depression diagnosis
2) GDS-S ≤ 5
3) MMSE ≤ 18

Dozeman 2011
n = 129

Primary outcome

Intervention
Outcome data included in the Review

Post intervention (no further details provided)

Outcome data included in the Review

Outcome data included in the Review

Outcome data included in the Review

Outcome data included in the Review

Outcome data included in the Review
<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>Inclusion criteria</th>
<th>Control group</th>
<th>Primary outcome</th>
<th>Intervention</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verkaik 2011</td>
<td>97</td>
<td>1) dementia diagnosis</td>
<td>RCT TAU</td>
<td>Depression</td>
<td>Increasing pleasant activities, decreasing unpleasant events and maintain activities in every day life</td>
<td>12 weeks</td>
</tr>
<tr>
<td>Meeks et al., 2015</td>
<td>82</td>
<td>1) aged ≤ 55, 2) DSM-IV depressive disorder or GDS ≤ 11</td>
<td>Cluster RCT TAU</td>
<td>Depression</td>
<td>BE-ACTIV (Behavioral Activities Intervention), reinforcing pleasant activities, depression management, confronting obstacles</td>
<td>12 weeks</td>
</tr>
<tr>
<td>BA-related interventions in people with dementia living in the community</td>
<td>72</td>
<td>1) dementia diagnosis</td>
<td>RCT TAU</td>
<td>Depression</td>
<td>BT-PE (Behavior Therapy-Pleasant Events), teaching carers behavioural strategies to address problem behaviors including depression, increasing pleasant events, problem-solving, addressing carer stress and burden</td>
<td>Post intervention 9 weeks</td>
</tr>
<tr>
<td>Teri 2003</td>
<td>153</td>
<td>1) NINDS-ADRDA criteria, 2) family carer, 2) living in the community</td>
<td>RCT TAU</td>
<td>Depression</td>
<td>RDAD (Reducing Disability in Alzheimer’s disease), increasing pleasant events, and modifying problem behaviours, increasing exercise, carer psychoeducation</td>
<td>3 months</td>
</tr>
<tr>
<td>Gitlin 2010</td>
<td>209</td>
<td>1) dementia diagnosis or</td>
<td>RCT Education</td>
<td>Function</td>
<td>COPE (Care of Persons with Dementia in their Environments), reducing environmental stressors,</td>
<td>4 months</td>
</tr>
<tr>
<td>MMSE &lt; 24</td>
<td>materials</td>
<td>identifying deficits and capabilities, engaging patients in activities based on strengths and interests</td>
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<tr>
<td>2) required assistance with daily activities/behaviour symptoms</td>
<td>Duration</td>
<td>10 sessions over 4 months</td>
<td></td>
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</tr>
</tbody>
</table>

Note: MMSE - Mini-Mental State Examination; BDI-II - Beck Depression Inventory-II; HAM-D/HRSD/HDRS - Hamilton Rating Scale for Depression; MDD - Major Depressive Disorder; RDC - Research Diagnostic Criteria; MSQ - Mental Status Questionnaire; GDS – Geriatric Depression Scale; TICS-M - Modified Telephone Interview for Cognitive Status; DSM-IV - Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition; HSCL-20 - Hopkins Symptom Checklist Depression Scale; SCID-5 - Structured Clinical Interview for DSM-5; SCL-20 - Symptom Checklist Depression Scale; PHQ-9 - Patient Health Questionnaire; MINI – Mini International Neuropsychiatric Interview; GDS-S - Geriatrics Depression Scale Short-Form; SADS - Schedule for Affective Disorders and Schizophrenia; CES-D - Center for Epidemiological Studies-Depression; PDC-dAD - Provisional Diagnostic Criteria for Depression of Alzheimer disease; CSDD – Cornell Scale for Depression in Dementia; DSM-III-R - Diagnostic & Statistical Manual of Mental Disorders–3rd Edition Revised; NINCDS-ADRDA - National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association; FIM – Functional Independence Measure.
### Table DS2  Excluded studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Steffen 2016</td>
<td>RCT of a behavioural intervention incorporating BA, relaxation and management of behaviour problems in dementia in carers of people with neurocognitive disorder</td>
</tr>
<tr>
<td>2 Egede 2015</td>
<td>Randomised controlled open-label, non-inferiority trial, of telemedicine-delivered vs face to face BA in veterans</td>
</tr>
<tr>
<td>3 Alexopoulos 2015</td>
<td>Not a RCT (open treatment trial), Problem Solving Therapy (PST) in older adults with major depression compared with historical comparison group</td>
</tr>
<tr>
<td>4 Kiosses 2015</td>
<td>RCT of Problem adaptation therapy vs supportive therapy in older adults with cognitive impairment</td>
</tr>
<tr>
<td>5 Choi 2014</td>
<td>RCT of tele-PST vs in person PST vs telephone support calls in depressed low income homebound older adults</td>
</tr>
<tr>
<td>6 Moore 2013</td>
<td>RCT of BA vs information support in family carers of people with dementia</td>
</tr>
<tr>
<td>7 Acieno 2012</td>
<td>Controlled before-and-after study of BA and therapeutic exposure for bereavement in older adults with MDD and PTSD</td>
</tr>
<tr>
<td>8 Losada 2011</td>
<td>RCT of BA and cognitive restructuring in carers of people with dementia</td>
</tr>
<tr>
<td>9 van't Veer-Tazelaar 2015</td>
<td>RCT of minimally supported self-help CBT, problem-solving treatment, and referral to a primary care physician for medication for older people with subthreshold depression or anxiety</td>
</tr>
<tr>
<td>10 Alexopoulos 2011</td>
<td>PST vs supportive therapy for older people with major depression and executive dysfunction</td>
</tr>
<tr>
<td>11 Sriwattanakomen 2008</td>
<td>RCT of PST with BA components vs a dietary education control condition in older black and white older adults with subthreshold depressive symptoms no data available</td>
</tr>
<tr>
<td>12 Gant 2007</td>
<td>RCT of BA in family carers of people with dementia incorporating improving mood through pleasant activities and managing problem behaviours</td>
</tr>
<tr>
<td>13 Götestam 1990</td>
<td>RCT of prompting and reinforcing activities in people with dementia vs prompting only vs control in which activities were not based on a BA model but on general activity training</td>
</tr>
<tr>
<td>14 Prick 2015</td>
<td>Multicomponent dyadic intervention in dementia caregiving dyads incorporating BA for the person with dementia, evaluated carer outcomes only</td>
</tr>
<tr>
<td>15 Lichtenberg 1996</td>
<td>Controlled trial (non RCT) of 2 behavioural treatments (selecting pleasant events, planning positive reinforcement strategies, and receiving support and reinforcement) in older inpatients with hip fracture, arthritis, and gait disturbances</td>
</tr>
<tr>
<td>16 Brand 1992</td>
<td>Controlled trial (non RCT) of group behavior therapy vs control in inpatient older adults with major depression</td>
</tr>
<tr>
<td>17 Clignet 2012</td>
<td>Case study of implementation of the Systematic Activation Method (SAM) incorporating activity scheduling as a nursing intervention in inpatients</td>
</tr>
<tr>
<td>18 Turner 2010</td>
<td>Case studies of BATA (Behavioral Activation Treatment of Anxiety) in older people</td>
</tr>
<tr>
<td>19 Guirguis-Younger 2008</td>
<td>Before-after experimental series design study of a behavioural-based intervention incorporating reinforcement of pleasant activities for older adults with depression</td>
</tr>
<tr>
<td>No.</td>
<td>Author(s)</td>
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<tr>
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<tr>
<td>20</td>
<td>Thompson &amp; Gallagher 1983</td>
</tr>
<tr>
<td>21</td>
<td>Teri 1991</td>
</tr>
<tr>
<td>22</td>
<td>Floyd 2004</td>
</tr>
<tr>
<td>23</td>
<td>Yon &amp; Scogin 2009</td>
</tr>
<tr>
<td>24</td>
<td>Teri 1991</td>
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<td>25</td>
<td>Gallagher 1981</td>
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<tr>
<td>26</td>
<td>Scogin 1987</td>
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<td>27</td>
<td>Breckenridge 1987</td>
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<tr>
<td>28</td>
<td>Jimenez 2015</td>
</tr>
<tr>
<td>29</td>
<td>Quijano 2007</td>
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<tr>
<td>30</td>
<td>Au 2015</td>
</tr>
<tr>
<td>31</td>
<td>Mausback 2014</td>
</tr>
<tr>
<td>32</td>
<td>Sallis 1983</td>
</tr>
<tr>
<td>33</td>
<td>Vázquez 2015</td>
</tr>
<tr>
<td>34</td>
<td>Lovett 1998</td>
</tr>
<tr>
<td>35</td>
<td>Alexopoulos 2003</td>
</tr>
<tr>
<td>36</td>
<td>Rokke 1999</td>
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</tbody>
</table>
Fig. DS1  Forest plot of multicomponent BA versus treatment as usual for older people living in the community with a diagnosis of depression or depressive symptoms. Outcome: Remission of depressive symptoms (3-6 months).

Fig. DS2  Forest plot of multicomponent BA versus treatment as usual for older people living in the community with a diagnosis of depression or depressive symptoms. Outcome: Remission of depressive symptoms (8-12 months).
Fig. DS3  Risk of bias graph: review authors’ judgements about each risk of bias item presented as percentages across all included studies.
**Fig. DS4** Funnel plot as indicator of publication bias: All BA studies in older people, without imputed studies.