

Jauhar et al. Cognitive-behavioural therapy for the symptoms of schizophrenia: systematic review and meta-analysis with examination of potential bias. *Br J Psychiatry* doi: 10.1192/bjp.bp.112.116285

## Data supplement 1

### *Formula for calculating PANSS total scores, from PANSS positive, negative and general psychopathology subscale scores*

The total score as the sum of the three subscale scores, and its standard deviation, were calculated from:

$$\sigma_T = \sqrt{\sigma_P^2 + \sigma_N^2 + \sigma_G^2 + 2\sigma_P\sigma_N\rho_{PN} + 2\sigma_P\sigma_G\rho_{PG} + 2\sigma_N\sigma_G\rho_{NG}}$$

where  $\sigma_T$ ,  $\sigma_P$ ,  $\sigma_N$  and  $\sigma_G$  are the standard deviations for the total, positive, negative and general psychopathology scores respectively, and  $\rho_{PN}$ ,  $\rho_{PG}$  and  $\rho_{NG}$  are the correlation coefficients between the subscale scores as reported by Peralta{Peralta, 1994 #150} in a sample of 100 patients with DSM-III-R schizophrenia.

**Table DS1** Summary table of study characteristics and effect sizes

(Note: a version of this table giving more detail/justification about the bias classifications is available at [www.cbtinschizophrenia.com/](http://www.cbtinschizophrenia.com/))

	<b>CBT N</b>	<b>Control N</b>	<b>Sequence generation</b>	<b>Allocation concealment</b>	<b>Blinding</b>	<b>Completeness of outcome data</b>	<b>Use of control intervention</b>	<b>Effect sizes (CI)</b>	<b>Notes</b>
Drury et al (1996) <sup>52</sup>	20	20	Low risk	Unclear	High risk	Low risk	Recreation and support	Positive -0.94 (-1.58/-0.30) Negative -0.18 (-0.79/-0.42)	-
Kuipers et al (1997) <sup>1</sup>	23	24	Low risk	Unclear	High risk	Low risk	No	Overall -0.34 (-0.91/+0.22)	-
Daniels et al (1998) <sup>77</sup>	20	20	Unclear	Unclear	Low risk	Unclear	No	Negative -0.67 (-1.30/-0.05)	-
Levine et al (1998) <sup>78</sup>	6	6	Unclear	Unclear	Unclear	Unclear	Group support	Overall -3.97 (-5.87/-2.07) Positive -1.60 (-2.83/-0.38) Negative -2.51 (-3.96/-1.06)	Total symptom score ES combined from PANSS subscale scores
Haddock et al (1999) <sup>79</sup>	8	10	Unclear	Unclear	Low risk	Low risk	Supportive counselling/ psychoeducation	Overall +0.57 (-0.34/+1.47)	-
Pinto et al (1999) <sup>80</sup>	19	18	Unclear	Unclear	High risk	Low risk	Supportive therapy	Overall -0.72 (-1.37/-0.07) Positive -0.79 (-1.45/-0.14) Negative -0.33 (-0.97/+0.30)	-
Tarrier et al (1999) <sup>72, 106</sup>	23	47	Low risk	Low risk	Low risk	Low risk	Two control groups used	Positive -0.43 (-0.92/+0.07) Negative -0.14 (-0.63/+0.35)	-
Bradshaw (2000) <sup>53</sup>	8	7	Unclear	Unclear	Low risk	High risk	No	Overall -1.45 (-2.54/-0.37)	-
LeClerc et al (2000) <sup>63</sup>	55	44	Unclear	Unclear	Low risk	Low risk	No	Overall -0.09 (-0.48/+0.31) Positive -0.08 (-0.48/+0.31) Negative +0.01 (-0.38/+0.40)	Total symptom score ES combined from PANSS subscale scores
Sensky et al (2000) <sup>8</sup>	46/44*	44	Unclear	Low risk	Low risk	Low risk	Befriending	Overall -0.08 (-0.49/+0.33) Negative +0.07 (-0.35/+0.48)	-
Turkington et al (2000) <sup>81</sup>	10	5	Unclear	Unclear	Low risk	Low risk	Befriending	Overall -1.14 (-2.22/-0.05)	-
Granholtm et al (2002) <sup>82</sup>	8	7	Unclear	Unclear	High risk	Unclear	No	Overall -0.74 (-1.73/+0.25) Positive -0.76 (-1.75/+0.23) Negative -0.03 (-0.98/+0.93)	Not a subgroup of Granholtm 2005
Lewis et al (2002) <sup>9</sup>	78*	131*	Low risk	Low risk	Low risk	Unclear	Two control groups used	Overall -0.01 (-0.29/+0.26) Positive -0.01 (-0.29/+0.27)	-

								Hallucinations -0.11 (-0.46/+0.25)	
Turkington et al (2002) <sup>13</sup>	257	165	Low risk	Unclear	Low risk	Low risk	No	Overall -0.22 (-0.42/-0.03)	-
Durham et al (2003) <sup>73</sup>	22	38	Low risk	Low risk	Low risk	Low risk	Two control groups used	Overall +0.19 (-0.33/+0.71) Positive +0.05 (-0.47/+0.57) Hallucinations -0.16 (-0.69/+0.36)	-
Gumley et al (2003) <sup>83</sup>	72	72	Unclear	Low risk	High risk	Low risk	No	Overall -0.42 (-0.75/-0.09) Positive -0.35 (-0.67/-0.02) Negative -0.35 (-0.69/-0.01)	Total symptom score ES combined from PANSS subscale scores
Jolley et al (2003) <sup>70</sup>	7	8	Low risk	Low risk	Unclear	Low risk	No	Overall +0.06 (-0.90/+1.01) Positive +0.11 (-0.84/+1.07) Negative -0.08 (-1.03/+0.88)	Total symptom score ES combined from PANSS subscale scores Blindness compromised
Rector et al (2003) <sup>84</sup>	24	18	Unclear	Low risk	Low risk	Low risk	No	Overall -0.70 (-1.32/-0.08) Positive -0.35 (-0.95/+0.25) Negative -0.49 (-1.10/+0.12)	Total symptom score ES combined from PANSS subscale scores
Wang et al (2003) <sup>85</sup>	126	125	Unclear	Unclear	High risk	Low risk	No	Overall -0.52 (-0.77/-0.27) Positive -0.69 (-0.95/-0.44) Negative -0.71 (-0.97/-0.46)	-
Bechdolf et al (2004) <sup>10</sup>	40	48	Low risk	Unclear	Low risk	Low risk	Psychoeducation	Overall +0.29 (-0.13/+0.71) Positive -0.02 (-0.44/+0.39) Negative +0.16 (-0.25/+0.58)	Total symptom score ES combined from PANSS subscale scores
Startup et al (2004) <sup>86</sup>	34	32	Low risk	Low risk	High risk	Low risk	No	Overall -0.60 (-1.09/-0.11) Positive -0.52 (-1.00/-0.03) Negative -0.32 (-0.80/+0.16)	Positive symptom score ES combined from SAPS delusion/hallucination and disorganisation scores
Trower et al (2004) <sup>87</sup>	15	17	Low risk	Low risk	Low risk	Low risk	No	Hallucinations -0.75 (-1.45/-0.05)	Hallucinations ES combined from PSYRATS subscale scores
Cather et al	15	13	Low risk	Low risk	Low risk	Low risk	Psychoeducation	Positive -0.05 (-0.77/+0.67)	-

(2005) <sup>88</sup>									Negative -0.01 (-0.73/+0.71) Hallucinations -0.20 (-0.92/+0.53)	
Granholm et al (2005) <sup>54</sup>	32/37**	33/39**	Low risk	Unclear	Low risk	Low risk	No		Overall -0.05 (-0.53/+0.43) Positive +0.35 (-0.10/+0.80) Negative +0.15 (-0.30/+0.59)	-
Valmaggia et al (2005) <sup>89</sup>	35	23	Low risk	Low risk	Low risk	Low risk	Supportive counselling		Overall +0.08 (-0.44/+0.60) Positive -0.30 (-0.83/+0.22) Negative +0.36 (-0.16/+0.89) Hallucinations -0.74 (-1.28/-0.21)	Total symptom score ES combined from PANSS subscale scores
Wykes et al (2005) <sup>90</sup>	37	36	Low risk	Low risk	High risk	Low risk	No		Hallucinations -0.03 (-0.48/+0.43)	-
Barrowclough et al (2006) <sup>91</sup>	54	45	Low risk	Low risk	Low risk	Low risk	No		Overall -0.25 (-0.65/+0.14) Positive -0.03 (-0.43/+0.36) Negative -0.06 (-0.45/+0.33)	-
Gaudio et al (2006) <sup>62</sup>	21	19	Low risk	High risk	High risk	Low risk	No		Overall -0.48 (-1.10/+0.14) Positive -0.96 (-1.61/-0.32) Negative +0.09 (-0.52/+0.69)	-
Penadés et al (2006) <sup>92</sup>	20	20	Low risk	Low risk	Low risk	Low risk	Cognitive remediation		Overall -0.55 (-1.17/+0.07) Positive +0.75 (+0.12/+1.38) Negative +0.11 (-0.50/+0.72)	PANSS total score data obtained from authors.
McLeod et al (2007) <sup>93</sup>	10	10	Unclear	Unclear	Unclear	Low risk	No		Hallucinations -1.06 (-1.96/-0.16)	Hallucinations ES combined from PSYRATS subscale scores
Deng et al (2008) <sup>94</sup>	64	64	Unclear	Unclear	High risk	Unclear	No		Overall -0.92 (-1.28/-0.56)	-
England et al (2007, 2008) <sup>95, 107</sup>	44	21	Low risk	Unclear	High risk	Low risk	No		Hallucinations -1.82 (-2.42/-1.22)	-
Garety et al (2008) (no carer) <sup>11</sup>	90*	90*	Low risk	Low risk	Low risk	Low risk	No		Overall -0.12 (-0.41/+0.17) Positive -0.17 (-0.46/+0.12) Negative -0.10 (-0.39/+0.19) Hallucinations +0.07 (-0.34/+0.49)	Hallucinations ES combined from PSYRATS subscale scores
Garety et al (2008) (carer) <sup>11</sup>	21*	23*	Low risk	Low risk	Low risk	Low risk	No		Overall -0.31 (-0.90/+0.27) Positive -0.20 (-0.79/+0.38) Negative -0.17 (-0.75/+0.41) Hallucinations -0.73 (-1.60/+0.14)	Hallucinations ES combined from PSYRATS subscale scores
Jackson et al (2008) <sup>71</sup>	31	31	Low risk	Low risk	Unclear	Low risk	Befriending		Positive -0.05 (-0.54/+0.44) Negative -0.44 (-0.94/+0.05)	Blindness compromised
LeComte et al (2008) <sup>69</sup>	36	51	High risk	Unclear	Low risk	Unclear	Two control groups used		Overall -0.15 (-0.57/+0.27) Positive -0.07 (-0.49/+0.35)	-

								Negative +0.14 (-0.28/+0.56)	
Wu et al (2008) <sup>96</sup>	48	52	Unclear	Unclear	High risk	Unclear	Unclear	Overall -1.52 (-1.96/-1.07)	Measure of positive symptoms not used, since based on scores on only 2 PANSS items
Farhall et al (2009) <sup>34</sup>	45	47	Low risk	Low risk	High risk	Low risk	No	Overall +0.01 (-0.39/+0.42) Positive -0.20 (-0.61/+0.20) Negative +0.36 (-0.05/+0.77)	-
Fowler et al (2009) <sup>35</sup>	20	23	Low risk	Unclear	Low risk	Low risk	No	Overall -0.34 (-0.94/+0.25)	-
Haddock et al (2009) <sup>36</sup>	approx 28*	approx 29*	Low risk	Low risk	Low risk	Low risk	Social activity therapy	Overall -0.23 (-0.75/+0.28) Positive -0.16 (-0.68/+0.35) Negative -0.38 (-0.90/+0.13) Hallucinations -0.11 (-0.67/+0.45)	Numbers in each group estimated from total study numbers.
Penn et al (2009) <sup>33</sup>	32	33	Low risk	Low risk	Low risk	Low risk	Supportive therapy	Hallucinations -0.12 (-0.61/+0.36)	-
Pinninti et al (2010) <sup>37</sup>	14	11	Low risk	Low risk	Low risk	High risk	No	Positive -0.34 (-1.11/+0.43) Hallucinations -0.13 (-0.89/+0.64)	-
Edwards et al (2011) (thioridazine) <sup>39</sup>	12	11	Unclear	Unclear	Low risk	Low risk	No	Positive -0.64 (-1.45/+0.17) Negative -0.62 (-1.43/+0.19)	-
Edwards et al (2011) (clozapine) <sup>39</sup>	11	14	Unclear	Unclear	Low risk	Low risk	No	Positive +0.19 (-0.58/+0.95) Negative -0.30 (-1.07/+0.47)	-
Grant et al (2011) <sup>40</sup>	31	29	Low risk	Low risk	Low risk	Low risk	No	Negative -0.06 (-0.56/+0.44)	Negative symptom ES combined from SANS subscale scores
Klingberg et al (2011) <sup>12</sup>	99	99	Low risk	Low risk	Low risk	Low risk	Cognitive remediation	Negative +0.12 (-0.16/+0.40)	-
Van der Gaag et al (2011) <sup>14</sup>	109	97	Low risk	Low risk	Unclear	Low risk	No	Overall -0.09 (-0.37/+0.18) Positive -0.46 (-0.73/-0.18)	Blindness compromised
White et al (2011) <sup>41</sup>	14	10	Low risk	Unclear	Low risk	Low risk	No	Positive -0.46 (-1.25/+0.33) Negative -0.40 (-1.20/+0.39)	-
Lincoln et al (2012) <sup>38</sup>	40	40	Low risk	Unclear	Unclear	Low risk	No	Overall -0.29 (-0.72/+0.15) Positive -0.41 (-0.85/+0.03) Negative +0.10 (-0.33/+0.54)	Blindness compromised

Shawyer et al (2012) <sup>43</sup>	19	18	Low risk	Low risk	Low risk	Low risk	Befriending	Hallucinations +0.53 (-0.11/+1.17)	Hallucinations ES combined from PSYRATS subscale scores
Granholm et al (2012) <sup>42</sup>	26	32	Low risk	Low risk	Low risk	High risk	Goal focused supportive contact	Positive -0.11 (-0.62/+0.40) Negative -0.05 (-0.56/+0.46)	-
Rathod et al (2012) <sup>97</sup>	13	14	Low risk	Low risk	Low risk	Low risk	No	Overall -0.18 (-0.91/+0.56) Negative +0.01 (-0.72/+0.74) Hallucinations -0.15 (-0.89/-0.58)	-

\*Numbers different in different analyses.

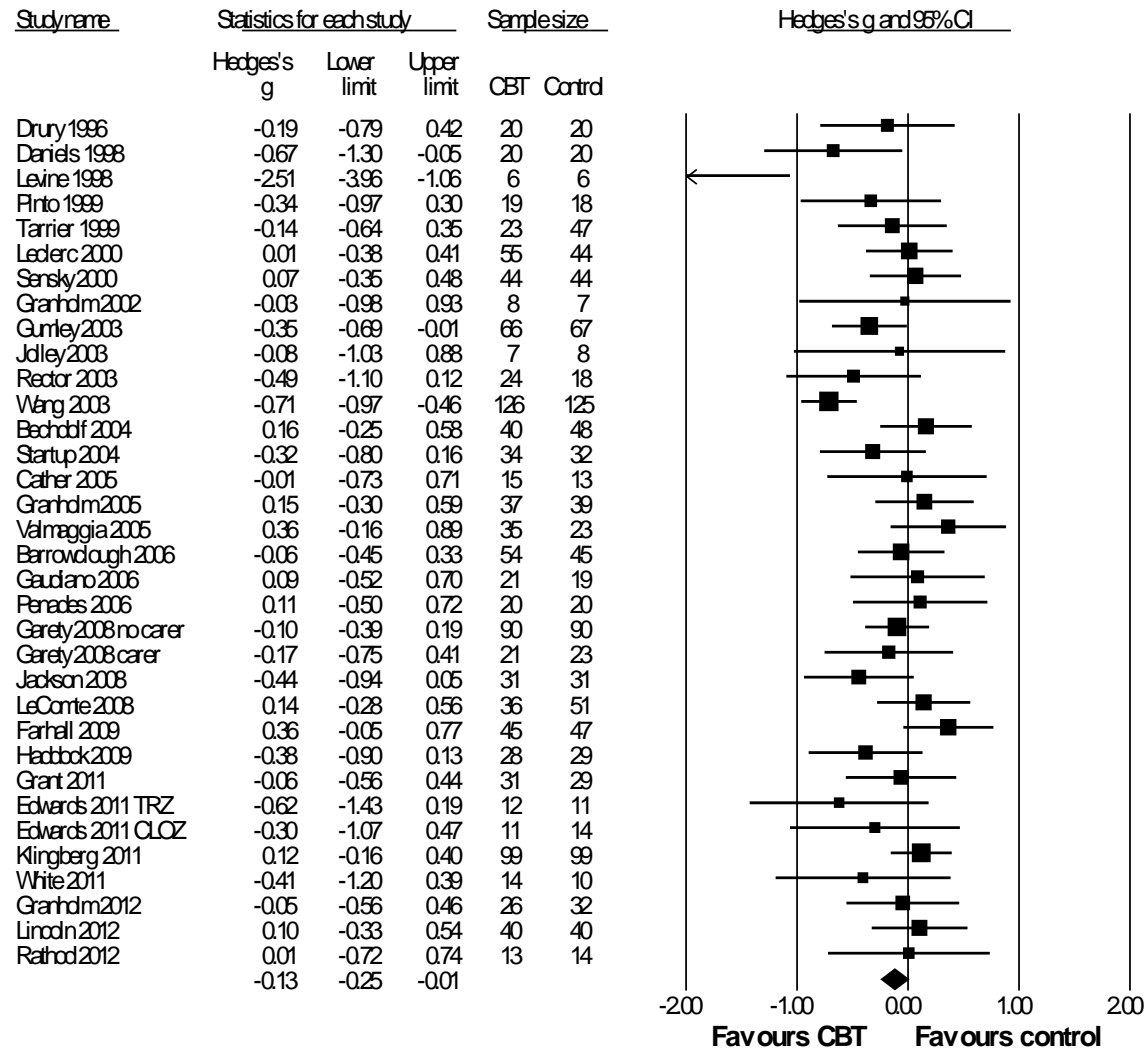
\*\*Numbers varied depending on whether ITT or completer data could be extracted.

#### **Additional references cited in table**

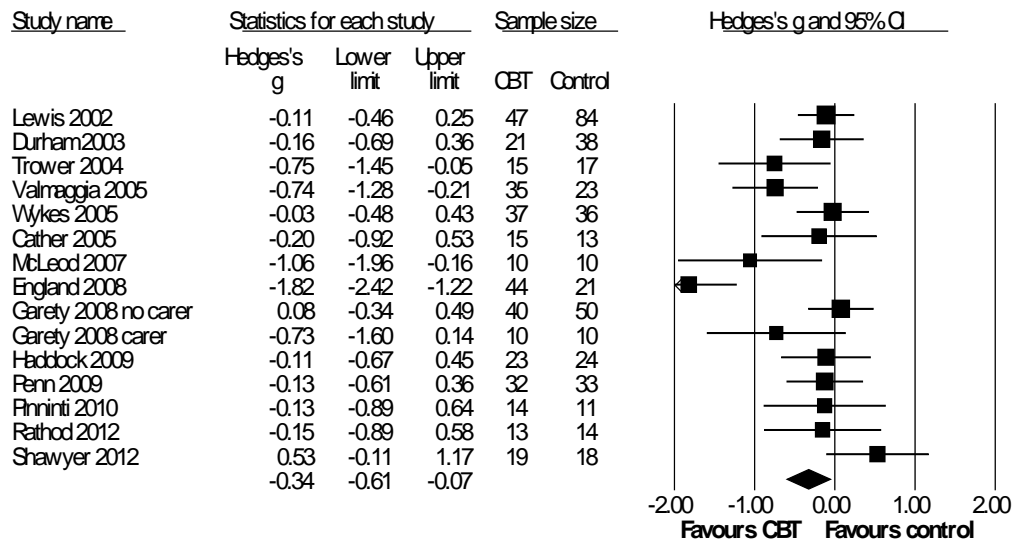
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**Fig. DS1** Forest plot of studies of negative symptoms



**Fig. DS2** Forest plot of studies of hallucinations





## Data supplement 2

### *Excluded studies*

(Note: only studies employing a control group are listed)

Milton et al, 1993<sup>1</sup>

- Effect sizes not extractable.

Tarrier et al, 1993<sup>2</sup>

- Waitlist control was not a parallel group.

Bentall et al, 1994/Haddock et al, 1998<sup>3,4</sup>

- Used an unpublished rating scale (for hallucinations).

Garety et al, 1994<sup>5</sup>

- Not randomized.

Kemp et al, 1996<sup>6</sup>

- Intervention now universally regarded as compliance therapy.

LeCompte & Pelc, 1996<sup>7</sup>

- Only relapse data reported.

Buchkremer et al, 1997<sup>8</sup>/Hornung et al 1995<sup>9</sup>

- CBT part of a multimodal intervention, not directed to symptoms

Jackson et al, 1998<sup>10</sup>

- Not randomized.

Barrowclough et al, 1999<sup>11</sup>

- Multimodal intervention given to pairs of patients and family members. Only half the pts received the CBT/psychotic symptoms part of package.

Bailer et al, 2001<sup>12</sup>

- Not randomized.

Barrowclough et al, 2001<sup>13</sup>

- Study carried out on dual diagnosis patients.

Klingberg et al, 2001<sup>14</sup>

- Intervention not CBT

Bach and Hayes, 2002<sup>15</sup>

- No symptom measures reported.

Hall and Tarrier, 2003<sup>16</sup>

- CBT directed only to self-esteem.

Power et al, 2003<sup>17</sup>

- CBT directed to suicidality. No diagnostic specification of patients.

Jenner et al, 2004<sup>18</sup>

- Multimodal intervention.

Kuipers et al, 2004<sup>19</sup>

- Multimodal intervention.

Morrison et al, 2004<sup>20</sup>

- Not randomized.

Jackson et al, 2005<sup>21</sup>

- Not adequately randomized (randomization by alternation).

Temple et al, 2005<sup>22</sup>

- Not randomized.

Baker et al, 2006<sup>23</sup>

- Study carried out on dual-diagnosis patients.

Garety et al, 2006<sup>24</sup>

- Multimodal intervention.

- Grawe et al, 2006<sup>25</sup>
- Multimodal intervention.
- Barton et al, 2009<sup>26</sup>
- Same study as Fowler et al (2009).
- Barretto et al, 2009<sup>27</sup>
- Not randomized.
- Chadwick et al, 2009<sup>28</sup>
- Effect sizes not extractable. Trial of mindfulness therapy (related to acceptance and commitment therapy).
- Gleeson et al, 2009<sup>29</sup>
- Multimodal intervention (CBT, family therapy, other optional modules) provided to both patients and families.
- Jackson et al, 2009<sup>30</sup>
- CBT directed to PTSD symptoms.
- Barrowclough et al, 2010<sup>31</sup>
- Study carried out on dual diagnosis patients.
- Peters et al, 2010<sup>32</sup>
- Study carried out on patients with psychotic symptoms but with no further diagnostic specification.
- Moritz et al, 2011<sup>33</sup>
- Multimodal intervention with overall small component of CBT.
- Mortan et al, 2011<sup>34</sup>
- Not adequately randomized.
- Premkumar et al, 2011<sup>35</sup>
- Not randomized.
- Palma-Sevillano et al, 2011<sup>36</sup>
- Multimodal intervention.
- Tundo et al, 2012<sup>37</sup>
- CBT directed to OCD symptoms.

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