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#### Understanding the contribution of intervention components: a network metaanalysis approach to psychological preparation for surgery

Powell, Rachael, Freeman, Suzanne, Scott, Neil, Sutton, Alex, Cooper, Nicola, Manyande, Anne ORCID: https://orcid.org/0000-0002-8257-0722, Vögele, Claus, Bruce, Julie, Byrne-Davis, Lucie and Johnston, Marie (2017) Understanding the contribution of intervention components: a network meta-analysis approach to psychological preparation for surgery. In: 31st Conference of the EHPS: Innovative ideas in Health Psychology, 29 Aug - 02 Sep 2017, Padova, Italy.

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## Understanding the contribution of intervention components: A network meta-analysis approach to psychological preparation for surgery

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#### Systematic review & meta-analysis

- Is there evidence for beneficial (or harmful) effects of psychological preparation for surgery?
- Which outcomes (pain, behavioural recovery, length of stay, negative affect) are improved (or worsened) following preparation?

Powell, Scott, Manyande, Bruce, Vögele, Byrne-Davis, Unsworth, Osmer, Johnston (2016). Cochrane Database of Systematic Reviews, Issue 5, Art.No.: CD008646.

# Methods: inclusion criteria

- Published and unpublished RCTs (NOT quasi-randomised); any language.
- Adults, elective surgery under general anaesthetic.

#### Intervention: pre-operative

- Procedural information
- Sensory information
- Behavioural instruction
- Cognitive intervention
- Relaxation
- Hypnosis
- Emotion-focused intervention

#### **Outcomes:** post-operative

- Pain
- Negative affect
- Length of stay
- Behavioural recovery



Study or Subgroup         Mean         SD         Total         Weight         Weight         W. Random, 95% C1         IV, Random, 95% C1           Barbaho-Moulim 2011         2         0         15         2.11         0.33         12         1.0%         1.80 (0.86, 4.68)           Bergin 2014a         2.5         0.6         50         2.7         0.6         56         5.8%         -0.00 (1.46, 0.26)		Psycholog	ical prepa	ration	C	ontrol			Mean Difference	Mean Difference
Ashton 1997 9.1 5.81 20 7.3 1.39 12 1.0% 1.80 [0.86, 4.66] Berahalho-Moulim 2011 2 0 0.5 2.11 0.33 17 Note stimable Beargin 2014 2.5 0.6 50 2.7 0.6 56 5.8% -0.20 [0.43, 0.03] Bitteril 2011 1 4.6 2.5 35 14.6 2.6 36 3.0% -0.00 [1.19, 1.19] Crowe 2003 6.55 4.2 68 10.5 14.2 64 0.6% -3.46 [5.75, -0.3] Crowe 2003 6.55 4.2 68 10.5 14.2 64 0.6% -3.06 [5.75, -0.3] Crowe 2003 6.55 4.2 68 10.5 14.2 64 0.6% -3.06 [5.75, -0.3] Crowe 2003 6.55 4.2 7 41 18 10 35 0.5% -6.00 [-095, -2.06] Dating 1998 12.5 2.97 54 12.57 2.97 54 3.1% -0.07 [-1.18, 1.03] Dering 2000 11.5 2.97 46 11.2 2.97 54 3.2% -0.07 [-1.18, 1.03] Dering 2000 11.5 2.97 46 1.2 2.97 54 3.2% -0.09 [-1.20, 0.84] Fotim 1976 6.35 2.31 37 6.44 1.61 32 3.7% -0.09 [-1.02, 0.84] Graude 2003 8.1 2.5 48 7.9 2.4 62 3.6% -0.09 [-1.02, 0.84] Huizebos 2006a 7.93 1.94 14 9.92 5.78 12 0.7% -1.09 [-5.41, 1.43] Langer 1975 6.36 2.97 13 9.6 2.97 14 1.4% -0.80 [3.04, 1.44] Langer 1975 6.36 2.97 14 7.6 2.97 14 1.4% -0.80 [3.04, 1.44] Langer 1975 6.36 2.97 14 7.6 2.97 15 4.20 0.84 Langer 1975 6.36 2.97 14 7.8 2.97 15 4.20 0.7% -1.09 [-1.60, 1.00] Leseman 1869 8.8 2.97 14 7.6 2.97 15 4.20 0.84 -0.01 [-2.60, 1.07] Langer 1975 6.36 2.97 14 7.6 2.97 15 4.20 0.7% -1.00 [-1.80, 0.20] Huizebos 2006a 7.93 1.94 14 9.92 5.78 12 0.0% -1.04 [-2.80, 0.50] Langer 1975 7.563 2.331 16 8.371 3.14 17 1.8% -0.80 [-3.66, 1.44] Lewin 1987 7.563 2.331 16 8.371 3.14 9.17 1.8% -0.30 [-1.42, 9.0.50] Huizebos 2006a 7.93 1.94 14 5.4 2.1 15 3.0% -0.30 [-1.42, 9.0.60] Langer 1975 7.563 2.371 1.1 4.51 2.10 0.0% -3.00 [-2.46, 0.16] Langer 1986 6.133 0.41 190 7.14 0.5 07 5.7% -0.30 [-2.46, 1.09, 1.00] Mahier 1986 6.133 0.41 190 7.14 0.5 07 5.7% -0.30 [-2.46, 1.09, 1.00] Hadimine 1986 6.8 5.9 2.07 40 8.82 2.97 20 2.2% 1.00 [-3.40, 2.40, 0.88] Hiderogenety 1.02 5.01 1 1.4 5.4 2.1 15 3.0% -0.30 [-1.44, 0.88] Jundeman 1073 6.7 2.5 1.8 0.99 16 7.7 20 2.7% 0.20 [-2.40, 0.49, -1.01] Hadimine 1986 0.618 0.41 190 7.14 0.5 07 5.7% -0.30 [-1.44, 0.49, -1.00] Hadimine 1980 0.545 1.20 2.97 51 1.8 2.	Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% Cl
Barbaho-Moulim 2011 2 0 16 2.11 0.33 17 Notestmable Beraupre 2004 6.7 2.2 55 7.3 2.5 60 3.9% 0.60 61 4.66, 0.20 Bergin 2014a 2.5 0.6 50 2.7 0.6 56 5.6% 0.20 [0.43, 0.03] Chaudhi 2005 8.29 2.39 18 10.11 2.39 18 2.2% 0.12 [3.38, 0.26] Chaudhi 2005 8.29 2.39 18 10.11 2.39 18 2.2% 0.12 [3.38, 0.26] Cuñado Barrio 1999 12 7 41 18 10 35 0.5% -6.00 [9.95, 2.05] Dulmo 1996 6.195 1.03 20 6.08 1 10 4.2% 0.12 [0.66, 7.57, 0.33] Dering 2000 11.5 2.97 58 12.575 2.97 54 3.2% 0.007 [1.18, 1.03] Dering 2000 11.5 2.97 46 11.2 2.97 54 3.1% 0.30 [0.87, 1.47] Feiton 1976 11.97 2.97 37 14 2.97 25 2.3% 0.20 [1.02, 0.81] Fortin 1976 6.35 2.31 37 6.44 1.61 32 3.7% 0.20 [1.02, 0.81] Fuze 2009 7.61 2.69 100 8.28 4.96 104 3.3% 0.66 7, 1.76, 0.42] Graudet 2003 8.1 2.5 6 48 7.9 2.4 52 3.6% 0.20 [0.76, 1.16] Huizebos 2006a 7.33 1.94 14 9.92 5.78 12 0.7% 1.99 [5.41, 1.43] Lam 2011 7 1 30 8 2 30 4.1% 0.19 [1.80, 0.20] Huizebos 2006a 7.63 2.331 16 8.371 3.148 17 1.8% 0.80 [3.04, 1.4] Leserman 1989 8.8 2.97 13 9.6 2.97 14 2.4% 0.61 3.04, 1.44 Levin 1987 7.663 2.331 16 8.371 3.148 17 1.8% 0.80 [3.04, 1.4] Leserman 1989 6.133 0.41 190 7.14 0.6 67 5.7% 0.90 [1.41, 0.80] Mahler 1986 6.133 0.41 190 7.14 0.5 67 5.7% 0.90 [1.41, 0.80] Mahler 1987 6.535 2.37 40 8.82 2.97 12 0.7% 0.50 [1.41, 0.80] Mahler 1988 6.133 0.41 190 7.14 0.5 67 5.7% 0.90 [1.41, 0.80] Mahler 1988 6.133 0.41 190 7.14 0.5 67 5.7% 0.90 [1.49, 0.80] Mahler 1987 7.56 3.2 2.97 40 8.82 2.97 20 2.2% 1.50 [0.09, 1.49, 0.80] Mahler 1987 7.56 3.2 47 40 8.82 2.97 20 2.2% 1.50 [0.09, 1.49, 0.80] Mahler 1987 6.35 2.47 40 8.82 2.97 20 2.2% 1.50 [0.09, 1.49, 0.80] Mahler 1987 7.56 0.36 2.97 40 8.82 2.97 20 2.2% 1.50 [0.09, 1.49, 0.20] Mahler 1987 7.5 0.8 20 9.6 1.7 20 4.0% 0.00 [1.48, 0.20] Mahler 1987 7.5 0.8 20 9.6 1.7 20 4.0% 0.92 [0.12, 1.96] Mahler 1989 6.133 0.41 190 7.14 0.5 67 5.7% 0.20 [0.72, 1.12] Mahler 1987 1.36 5.9 202 6.6 3.1 0.94 16.4 5.9 0.24 1.50 [0.71] Huizeboxe 2004 6.8 5.9 202 6.6 3.1 204 3.7% 0.20 [0.72, 1.12] Huizeboxe 2004 6.8 5.9 202 6.6 3.1	Ashton 1997	9.1	5.81	20	7.3	1.39	12	1.0%	1.80 [-0.86, 4.46]	
Beaupe 2004 6.7 2.2 56 7.3 2.5 60 3.9% -0.60 [1.46, 0.26] Bergin 2014 2.5 0.6 50 2.7 0.6 56 56% -0.20 [0.43, 0.03] Enter 12011 14.6 2.5 35 14.6 2.6 36 3.0% 0.00 [1.19, 1.19] Crowe 2003 6.55 4.2 68 10.5 14.2 64 0.6% -3.95 [7.57, 0.33] Crowe 2003 6.55 4.2 68 10.5 14.2 64 0.6% -3.95 [7.57, 0.33] Dulma 1996 6.195 10.3 20 6.08 1 10 4.2% 0.12 [0.65, 0.86] Dulma 1998 12.5 2.97 56 12.575 2.97 54 3.2% -0.07 [1.18, 10] Delma 1986 6.195 1.03 20 6.08 1 10 4.2% 0.12 [0.65, 0.86] Delma 1998 12.5 2.97 56 12.575 2.97 54 3.2% -0.07 [1.18, 10] Delma 1986 6.35 2.31 37 6.44 1.61 32 3.7% -0.09 [1.02, 0.84] Fortin 1976 6.36 2.31 37 6.44 1.61 32 3.7% -0.09 [1.02, 0.84] Fortin 1976 6.36 2.31 37 6.44 1.61 32 3.7% -0.09 [1.02, 0.84] Graudet 2003 8.1 2.5 48 7.9 2.4 52 3.3% -0.09 [1.10, 0.84] Graudet 2003 8.1 2.5 48 7.9 2.4 52 3.6% 0.20 [1.07, 6.14] Lamger 1975 6.36 2.97 14 7.6 2.97 15 2.0% -1.12 [2.08, 0.2] Leseman 1889 8.8 2.97 13 9.6 2.97 14 1.4% -0.80 [3.04, 1.43] Lenger 1975 6.36 2.331 134 45 2.97 14 1.48 -0.80 [1.28, 0.10] Leseman 189 8.8 2.97 13 9.6 2.97 14 1.48 -0.80 [1.28, 0.10] Leseman 189 8.8 2.97 13 9.6 2.97 14 1.48 -0.80 [1.28, 0.10] Leseman 189 8.8 2.97 13 9.6 2.97 14 1.48 -0.80 [1.24, 2.3, 0.0] Leseman 189 8.8 2.97 13 9.6 2.97 14 1.48 -0.80 [1.24, 2.3, 0.0] Leseman 189 8.8 2.97 13 1.44 5.1 2 30 0.8% -0.01 [1.22, 3.20] Leseman 189 8.8 2.97 13 1.48 17 1.8% -0.80 [1.24, 2.3, 0.0] Hidden 2006 7.7 563 2.331 1.48 8.10 2.37 1.5 0.00 [1.48, 0.61] Leseman 189 8.8 2.97 12 1.11 5 3.0% -0.30 [1.48, 0.61] Leseman 189 8.8 2.97 12 1.18 2.97 20 1.5% -0.09 [1.01, 0.0] Hidden 2006 8.73 15 1.8 2.97 20 1.6% -3.00 [1.49, 0.61] Hidden 2004 15 2.57 15 1.8 2.97 20 1.6% -3.00 [1.49, 0.61] Total (95% CI) Hidden 2000 5.58 1.24 2.95 1.8 0.97 20 2.2% 1.50 [0.03, 1.0] Total (95% CI) Hidden 2000 5.58 1.24 2.92 5.13 0.99 16 4.5% 0.02 [1.21, 1.0] Hidden 2000 0.558 1.22 2.95 5.1 0.99 16 4.5% 0.02 [1.21, 2.91] Hidden 2000 0.558 1.22 2.95 5.1 0.99 1.90 2.92 [1.21, 2.91] Hidden 2000 0.558 1.22 2.95 5.1 0.90 1.90 1.90 [1.48, 0.	Barbalho-Moulim 2011	2	0	15	2.11	0.33	17		Not estimable	
Bergin 2014a 2.5 0.6 50 2.7 0.6 56 5.6% -0.20 [0.43, 0.03] Chaudhri 2005 8.29 2.39 18 10.11 2.39 18 2.2% -1.62 [3.38, -0.26] Chaudhri 2005 8.29 2.39 18 10.11 2.39 18 2.2% -1.62 [3.38, -0.26] Cuñado Barrio 1999 12 7 41 18 10 35 0.5% -5.00 [9.95, -2.05] Dulma 1966 1.95 1.03 20 6.08 1 10 4.2% 0.07 [1.18, 10.3] Dering 2000 11.5 2.97 56 12.575 2.97 54 3.2% -0.07 [1.18, 10.3] Dering 2000 11.5 2.97 46 11.2 2.97 54 3.1% 0.30 [-0.57, 1.47] Fortin 1976 0.35 2.31 37 6.44 1.61 32 3.7% -0.09 [1.02, 0.64] Graude 2003 8.1 2.5 48 7.9 2.4 52 3.3% -0.27 [1.0, 0.42] Graude 2003 8.1 2.5 48 7.9 2.4 52 3.3% -0.20 [-0.76, 1.16] Langer 1975 6.36 2.97 14 7.6 2.97 15 2.0% 1.24 [-2.68, 0.50] Leserman 1989 8.8 2.97 13 0.8 2 30 4.1% -1.00 [-1.80, 0.20] Leserman 1989 8.8 2.97 13 9.6 2.37 14 1.4% -0.80 [-3.04, 1.43] Levin 1987 7.563 2.331 1.34 8 1.3 1.48 17 1.8% -0.80 [-3.04, 1.43] Levin 1987 7.563 2.331 1.44 8.92 7.78 12 0.7% -1.99 [5.41, 1.43] Levin 1987 7.563 2.331 1.44 8.27 20 1.6% 3.39% 0.01 [-3.22, 3.20] Hulmehave 2006a 1.40 6.77 32 1.41 6.12 30 0.8% 0.01 [-3.22, 3.20] Hulmehave 2005 1.40.9 6.77 32 1.41 6.12 30 0.8% 0.00 [-0.12, 1.6] Hahler 1985 6.035 1.048 19 6.04 1.7 10 3.1% -0.00 [-3.04, 1.44] Hahler 1988 6.18 0.41 190 7.14 0.6 67 5.7% -0.09 [-1.10, 0.8] Mahler 1988 1.2.4 3.6 2.5 18.6 6.8 20 0.05 [0.81, 0.91] Mahler 1988 1.2.4 3.6 2.97 14 1.40 8.6 7 5.7% -0.09 [-1.10, 0.8] Fildgeway 1982 10.325 2.97 14 1.45 2.97 20 2.2% 1.50 [-0.03, 1.0] Mahler 1988 1.2.4 3.6 2.5 18.6 6.8 20 0.00 5[-0.81, 0.9] Mahler 1988 1.2.4 3.6 2.5 18.6 6.8 20 0.00 5[-0.81, 0.9] Mahler 1988 1.2.4 3.6 2.5 18.6 6.8 20 0.00 5[-0.81, 0.9] Mahler 1986 1.0.32 2.97 14 1.48 2.97 22 2.9% 0.00 5[-0.81, 0.9] Mahler 1986 1.03 2.97 14 1.40 0.6 7 5.7% 0.09 [-1.11, 0.80] Hahler 1986 1.03 2.97 14 1.40 0.6 7 5.7% 0.09 [-1.11, 0.80] Hahler 1986 1.03 2.97 2.5 11.8 2.97 2.5 2.1% 0.00 [-1.85, 1.65] Total (95% CI) 10 10.0 5.04 3.0 3.17 20 4.0% -2.01 [-2.22, 1.28] Heterogeneity. Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 1.29.00, df= 34 (P < 0.	Beaupre 2004	6.7	2.2	55	7.3	2.5	60	3.9%	-0.60 [-1.46, 0.26]	
Bitterin 2011 14.6 2.5 35 14.6 2.6 36 3.0% $0.00 [-1.19, 1.19]$ Chaudhi 2005 8.29 2.39 18 10.11 2.39 18 2.2% $-1.82 [-3.8, 0.26]$ Crowe 2003 6.55 4.2 68 10.5 14.2 64 0.6% $-3.95 [-7.57, 0.3]$ Crowe 2003 6.55 4.2 68 10.5 14.2 64 0.6% $-3.95 [-7.57, 0.3]$ D'Lima 1996 6.195 1.03 20 6.08 1 10 4.2% $-0.07 [-1.18, 1.03]$ Dering 2000 11.5 2.97 58 12.575 2.97 54 3.2% $-0.07 [-1.18, 1.03]$ Dering 2000 11.5 2.97 46 11.2 2.97 54 3.1% $-0.09 [-1.02, 0.84]$ Fortin 1976 11.97 2.97 37 14 2.97 25 2.3% $-2.03 [-3.54, -0.52]$ Furze 2009 7.61 2.69 100 8.28 4.96 104 3.3% $-0.67 [-1.76, 0.42]$ Giraudet 2003 8.1 2.5 48 7.9 2.4 52 3.6% $-0.07 [-1.16, 1.6]$ Huizebos 2006a 7.93 1.94 14 9.92 5.78 12 0.7% $-1.99 [-5.41, 1.43]$ Lamo 201 7 1 30 8 2 30 4.1% $-1.00 [-1.80, -0.20]$ Lame 1975 6.3.6 2.97 44 7.6 2.97 15 2.0% $-1.24 [-2.98, 0.50]$ Lame 1987 7.563 2.331 16 8.371 3.148 17 18% $-0.01 [-2.28, 0.50]$ Langer 1975 6.3.6 2.97 44 7.6 2.97 14 1.4% $-0.00 [-3.04, 1.44]$ Levin 1987 7.563 2.331 16 8.371 3.148 17 10 3.1% $-0.01 [-2.02, 0.20]$ Lindeman 1973 6.7 2.56 90 6.65 3.18 86 3.9% $0.05 [-0.81, 0.91]$ Lindeman 1973 6.7 2.56 90 6.65 3.18 86 3.9% $0.05 [-0.81, 0.91]$ Lindeman 1973 1.4.4 3.6 25 11.8 2.97 20 1.6% $-3.00 [-4.49, -1.01]$ Mahier 1985 5.035 1.048 19 6.04 1.7 10 3.1% $-1.00 [-1.20, -0.0]$ Lindeman 1973 1.2.4 3.6 25 11.8 2.97 20 2.2% $-0.00 [-1.41, -0.60]$ Mahier 1986 1.2.4 3.6 25 11.8 2.97 20 2.2% $-0.00 [-1.45, 1.65]$ Mahier 1986 1.2.4 3.6 25 11.8 2.97 22 2.23 3.00 [-4.99, -1.01] Schmitt 1973 11.8 2.97 25 11.8 2.97 25 2.1% $-0.00 [-1.40, 0.88]$ Wath-Watson 2000 5.595 1.922 29 5.13 0.99 16 4.45% $-0.96 [-2.2, 1.2]$ Withou 1981 6.64 5.9 2.02 6.6 3.1 20 0.00 [-1.65, 1.65] The 1982 8.12 3.563 71 9.08 3.563 40 2.6% $-0.96 [-2.3, 0.2]$ Withou 1981 6.64 5.9 2.02 6.6 3.1 20 0.00 [-1.65, 1.65] The 1982 8.12 3.563 71 9.08 3.563 40 2.6% $-0.96 [-2.3, 0.2]$ Hieterogeneity. Tau" = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); P = 748	Bergin 2014a	2.5	0.6	50	2.7	0.6	56	5.6%	-0.20 [-0.43, 0.03]	-
Chaudhri 2005 8.29 2.39 18 10.11 2.39 18 2.2% -1.82 [= 3.8, -0.26] Crowe 2003 6.55 4.2 68 10.5 14.2 64 0.6% -3.95 F.7.57, -0.33 Cuñado Barrio 1999 12 7 41 18 10 35 0.5% -6.00 [= 9.95, -2.05] Daltroy 1998 12.5 2.97 58 12.575 2.97 54 31% -0.07 [= 1.8, 1.03] Dering 2000 11.5 2.97 46 11.2 2.97 54 31% -0.07 [= 1.8, 1.03] Fertin 1976 11.97 2.97 37 14 2.97 25 2.3% -0.09 [= 1.02, 0.84] Furze 2003 7.61 2.69 100 8.28 4.96 104 3.3% -0.07 [= 1.76, 0.42] Graudet 2003 8.1 2.5 48 7.9 2.4 52 3.6% 0.20 [= 0.76, 1.16] Huizebos 2006a 7.93 1.94 14 9.29 5.78 12 0.7% -1.99 [5.41, 1.43] Lamger 1975 6.36 2.97 14 14 7.9 2.97 37 14 2.07 15 2.0% Langer 1975 6.36 2.97 13 9.6 2.97 14 1.7% -0.08 [= 1.06, 1.06] Leserman 1989 8.8 2.97 13 9.6 2.97 14 1.4% -0.80 [= 3.04, 1.44] Levin 1987 7.56 3.231 1.6 6.51 3.18 86 3.9% -0.01 [= 3.2, 3.20] Levin 1987 7.563 1.048 19 6.04 1.7 10 8.7% -0.09 [= 1.02, 3.20] Huidebos 2006 15 1.048 19 6.04 1.7 10 8.3 9% -0.01 [= 3.2, 3.20] Huidebos 2000 15 2.97 15 18 2.97 20 1.6% -0.09 [= 1.02, 0.10] Mahler 1985 6.033 1.048 19 6.04 1.7 10 3.0% -0.01 [= 3.2, 3.20] Mahler 1988 1.24 3.6 25 18.6 6.6 20 0.7% -6.20 [= 4.2, 2.98] Mahler 1988 6.133 0.41 190 7.14 0.6 67 5.7% -0.09 [= 1.1, 0.80] Mahler 1988 6.138 0.41 190 7.14 0.6 67 5.7% -0.09 [= 1.1, 0.80] Mahler 1988 6.138 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Mahler 1988 6.138 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Mahler 1988 6.138 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Mahler 1988 6.138 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Mahler 1986 6.138 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Mahler 1986 6.13 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Mahler 1986 6.13 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Mahler 1986 6.13 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Mahler 1986 6.13 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Mahler 1986 6.13 0.41 190 7.14 0.6 8.7 5.7% -0.09 [= 1.1, 0.80] Halterogenety Tar#= 0.40; Chi <sup>#</sup> = 129.00, df = 34 (P < 0.00001); P = 74% Heterogenety Tar#= 0.40; Chi <sup>#</sup> =	Bitterli 2011	14.6	2.5	35	14.6	2.6	36	3.0%	0.00 [-1.19, 1.19]	<del></del>
Crowe 2003 6.55 4.2 68 10.5 14.2 64 0.6% -3.95 f.7.57.0.33] Units 1996 6.195 1.03 20 6.08 1 10 4.2% 0.02 [-0.65.0.86] D'Lima 1996 6.195 1.03 20 6.08 1 10 4.2% 0.07 [-1.18,1.03] Detring 2000 11.5 2.97 46 11.2 2.97 54 3.2% 0.07 [-1.18,1.03] Detring 2000 11.5 2.97 46 11.2 2.97 54 3.2% 0.02 [-0.76, 1.47] Fetton 1976 1.1.97 2.97 37 14 2.97 25 2.3% -2.03 [-3.54, -0.52] Furze 2009 7.61 2.69 100 8.28 4.96 104 32 3.7% 0.09 [-1.02, 0.84] Furze 2009 7.61 2.69 100 8.28 4.96 104 3.3% 0.07 [-1.76, 0.42] Furze 2009 7.61 2.69 100 8.28 4.96 104 3.3% 0.02 [-0.76, 1.16] Huizebos 2006a 7.93 1.94 14 9.92 5.78 12 0.7% -1.99 [-5.41, 1.43] Lam 2011 7 1 30 8 2 30 4.1% -1.00 [+1.80, 0.20] Langer 1975 6.36 2.97 44 7.6 2.97 15 2.0% -1.24 [-2.98, 0.50] Lamegr 1975 6.36 2.931 16 8.371 3.148 17 1.8% -0.81 [-2.04, 1.44] Levin 1987 7.563 2.331 16 8.371 3.148 17 1.8% -0.81 [-2.04, 1.44] Levin 1987 7.563 2.331 16 8.371 3.148 86 3.9% 0.05 [-0.81, 0.91] Mahier 1995 5.035 1.048 19 6.04 1.7 10 3.1% -0.01 [-1.22, 2.20] Lindeman 1973 6.7 2.56 90 6.65 3.18 86 3.9% 0.05 [-0.81, 0.91] Mahier 1998 12.4 3.6 25 18.6 6.6 20 0.7% -6.20 [-9.42, -2.98] Mahier 1998 12.4 3.6 25 18.6 5.6 20 0.7% -6.20 [-9.42, -2.98] Rajendran 1988 12.4 3.6 25 18.6 5.6 20 0.7% -6.20 [-9.42, -2.98] Rajendran 1988 12.4 3.6 25 18.6 5.6 20 0.7% -6.20 [-9.42, -2.98] Rajendran 1986 12.4 3.6 25 18.6 5.6 20 0.7% -6.20 [-9.42, -2.98] Mahier 1986 10.32 3.77 5 11 8 2.97 20 2.2% 1.56 [-0.09, 3.10] Kerregor 2004 15 2.97 15 18 2.97 20 2.2% 1.56 [-0.09, 3.10] Kerregor 2004 15 2.97 15 18 2.97 20 2.2% 1.56 [-0.09, 3.10] Kerregor 2004 15 2.97 25 11.8 2.97 22 2.1% 0.00 [-1.65, 1.65] Kiddeway 1982 10.325 2.97 40 8.82 2.97 20 2.2% 1.56 [-0.09, 3.10] Kerregor 2004 5.85 1.292 29 5.13 0.99 16 4.5% 0.46 [-0.22, 1.13] Kerregor 2000 5.856 1.292 29 5.13 0.99 16 4.5% 0.46 [-0.22, 1.13] Kiddeway 1982 10.325 2.97 40 8.82 2.97 20 2.2% 1.56 [-0.09, 2.10,	Chaudhri 2005	8.29	2.39	18	10.11	2.39	18	2.2%	-1.82 [-3.38, -0.26]	
Cuñado Barrio 1999       12       7       41       18       10       35       -6.00 [-9.95, -2.05]         Daltroy 1998       12.5       2.97       58       12.575       2.97       54       3.2%       -0.07 [-1.18, 1.03]         Dering 2000       11.5       2.97       46       11.2       2.97       54       3.2%       -0.07 [-1.18, 1.03]         Fortin 1976       11.97       2.97       37       14       2.97       25       2.3%       -0.09 [-1.02, 0.84]         Fortin 1976       6.35       2.31       37       6.44       1.61       32       3.7%       -0.09 [-1.02, 0.84]         Giraudet 2003       8.1       2.5       48       7.9       2.4       52       3.6%       0.20 [-0.76, 1.16]         Langer 1975       6.36       2.97       14       0.8       2.97       1.98 [-5.41, 1.43]       -1.24 [-28, 0.50]         Langer 1975       6.36       2.97       13       9.6       2.97       15       2.0%       -0.00 [-3.04, 1.44]         Leserman 1989       8.8       2.97       13       9.6       2.97       10       3.0%       -0.05 [-0.81, 0.91]       -1.04 [-2.98, 0.50]       -1.04 [-2.98, 0.50]       -1.04 [-2.98, 0.50]       -1.04	Crowe 2003	6.55	4.2	68	10.5	14.2	64	0.6%	-3.95 [-7.57, -0.33]	
D'Lima 1996 6.195 1.03 20 6.08 1 100 4.2% 0.12 [0.65, 0.88] Daltroy 1998 1.2.5 2.97 56 12.575 2.97 54 3.1% 0.30 [0.87, 1.47] Derting 2000 11.5 2.97 46 11.2 2.97 54 3.1% 0.30 [0.87, 1.47] Felton 1976 11.97 2.97 37 114 2.97 25 2.3% -2.03 [-3.54, -0.52] Furze 2009 7.61 2.69 100 8.28 4.96 104 3.3% -0.067 [-1.76, 0.42] Furze 2009 7.61 2.69 100 8.28 4.96 104 3.3% -0.067 [-1.76, 0.42] Furze 2009 7.61 2.69 100 8.28 4.96 104 3.3% -0.067 [-1.76, 0.42] Furze 2009 7.61 2.69 100 8.28 4.96 104 3.3% -0.67 [-1.76, 0.42] Furze 2009 7.61 2.69 100 8.28 4.96 104 3.3% -0.067 [-1.76, 0.42] Furze 2009 7.61 2.69 100 8.29 4.96 104 3.3% -0.067 [-1.76, 0.42] Furze 2009 7.61 2.69 1.00 8.29 4.96 104 3.3% -0.067 [-1.76, 0.42] Langer 1975 6.36 2.97 44 7.6 2.97 15 2.0% -1.24 [-2.98, 0.50] Leseman 1989 8.8 2.97 13 9.6 2.97 15 2.0% -1.24 [-2.98, 0.50] Leseman 1989 8.8 2.97 13 9.6 2.97 14 1.48 17 1.8% -0.88 [-3.04, 1.44] Levin 1987 7.563 2.331 16 8.571 3.148 17 1.8% -0.88 [-3.04, 1.44] Lindeman 1973 6.7 2.56 90 6.65 3.18 86 3.9% -0.01 [-3.22, 3.20] Hahler 1995 5.035 1.048 19 6.04 1.7 10 0.8% -0.01 [-3.22, 3.20] Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% -0.96 [-1.11, -0.80] Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% -0.96 [-1.11, -0.80] Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% -0.96 [-1.11, -0.80] Fictorego 2004 15 2.97 15 18 2.97 20 1.6% -3.00 [-4.80, -1.01] Mahler 1998 6.183 0.41 89 6.04 1.7 10 0.216, 0.15] Fictorego 2004 15 2.97 40 8.82 2.97 20 2.2% 1.50 [-0.09, 3.10] Mahler 1998 12.4 3.6 25 11.8 2.97 22 2.2% 1.50 [-0.09, 3.10] Mahler 1998 12.4 3.6 25 1.92 2.97 4.0 8.82 2.97 2.0 1.6% -0.30 [-1.48, 0.88] Fidgeway 1892 10.325 2.97 40 8.82 2.97 20 2.2% 1.50 [-0.09, 3.10] Jochmitt 1973 11.8 2.97 25 11.8 2.97 25 2.1% 0.00 [-1.65, 1.65] Shultham 2000 5.565 1.292 2.9 5.13 0.99 16 4.45% 0.46 [-0.2, 1.13] Watt-Watson 2004 6.8 5.9 202 6.6 3.1 204 3.7% 0.20 [-0.72, 1.12] Jumate 2.812 3.563 7.1 9.08 3.563 40 2.6% -0.96 [-2.34, 0.42] Jumate 2.812 3.563 7.1 9.08 3.563 40 2.6% -0.96 [-2.34, 0.42] Jumate 2.812 3.563 7.1 9.	Cuñado Barrio 1999	12	7	41	18	10	35	0.5%	-6.00 [-9.95, -2.05]	
Dattory 1998       12.5       2.97       68       12.57       2.97       54       3.2%       -0.07       [+1.8, 1.03]         Deering 2000       11.5       2.97       37       14       2.97       54       3.1%       0.30       0.09       1.47         Feiton 1976       11.97       2.97       37       14       2.97       25       2.3%       -2.03       [:3.54, -0.52]         Fortin 1976       6.35       2.31       37       6.44       1.61       32       3.7%       -0.09       [:1.76, 0.42]         Giraudt 2003       8.1       2.5       48       7.9       2.4       52       3.6%       0.20       [:5.41, 1.43]         Lamge 2006a       7.93       1.94       1.4       9.92       5.78       12       0.7%       -1.09       [:5.41, 1.43]         Langer 1975       6.36       2.97       14       1.4%       -0.80       [:3.08, -0.01]       -         Lesvin 1987       7.663       2.331       16       8.371       3.148       17       1.8%       -0.81       [:3.68, 1.091]       -         Mahier 1998       6.183       0.41       190       7.14       0.6       67       7.90       -0.96<	D'Lima 1996	6.195	1.03	20	6.08	1	10	4.2%	0.12 [-0.65, 0.88]	+
Deering 2000 11.5 2.97 46 11.2 2.97 53 3.1% 0.30 [0.97, 1.47] Felton 1976 11.97 2.97 37 14 2.97 25 2.3% -2.03 [3.54, 4.052] Fortin 1976 13.5 2.31 37 6.44 1.61 32 3.7% -0.09 [-1.02, 0.84] Furze 2009 7.61 2.69 100 8.28 4.96 104 3.3% -0.67 [-1.76, 0.42] Giraudet 2003 8.1 2.5 48 7.9 2.4 52 3.6% 0.20 [0.76, 1.6] Hulzebos 2006a 7.93 1.94 14 9.92 5.78 12 0.7% -1.99 [5.41, 1.43] Lam 2001 7 1 30 8 2 30 4.1% -1.00 [-1.80, -0.20] Langer 1975 6.36 2.97 44 7.6 2.97 15 2.0% -1.24 [-2.88, 0.50] Leserman 1989 8.8 2.97 13 9.6 2.97 14 1.4% -0.80 [-3.04, 1.44] Levin 1987 7.563 2.331 16 8.371 3.148 17 1.8% -0.81 [-2.69, 1.07] Lindeman 1973 6.7 2.56 90 6.65 3.18 86 3.9% 0.05 [-0.81, 0.91] Mahler 1995 5.035 1.048 19 6.04 1.7 10 3.1% -1.00 [-2.16, 0.15] Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% -0.96 [-1.11, -0.80] Mahler 1998 12.4 3.6 25 18.6 6.6 20 0.7% -6.20 [-9.42, -2.98] Ridgeway 1982 10.325 2.97 40 8.82 2.97 20 1.6% -3.00 [-4.89, -1.01] Osting 2012 5.1 1 14 5.4 2.1 15 3.0% -0.30 [-1.48, 0.88] Ridgeway 1982 10.325 2.97 40 8.82 2.97 20 2.2% 1.50 [-0.99, 3.10] Schmitt 1973 11.8 2.97 25 11.8 2.97 25 2.1% 0.00 [-1.65, 1.65] Watt-Watson 2004 6.8 5.9 202 6.6 3.1 204 3.7% 0.20 [-0.72, 1.12] Witson 1981 6.962 1.366 54 7.947 1.434 18 4.2% -0.99 [-1.74, -0.23] Zhang 2012 7.5 0.8 20 9.6 1.7 20 4.0% -2.16 [-2.22, 1.2] Witson 1981 6.962 1.366 54 7.947 1.434 18 4.2% -0.99 [-1.74, -0.23] Zhang 2012 7.5 0.8 20 9.6 1.7 20 4.0% -2.16 [-2.92, 1.2] Witson 1981 6.962 1.366 54 7.947 1.434 18 4.2% -0.99 [-1.74, -0.23] Zhang 2012 7.5 0.8 20 9.6 1.7 20 4.0% -0.20 [-0.72, 1.12] Witson 1981 6.962 1.366 54 7.947 1.434 18 4.2% -0.99 [-1.74, -0.23] Zhang 2012 7.5 0.8 20 9.6 1.7 20 4.0% -0.20 [-0.78, 0.78] Heterogenetity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (F < 0.00001); F = 74%	Daltroy 1998	12.5	2.97	58	12.575	2.97	54	3.2%	-0.07 [-1.18, 1.03]	-+-
Felton 1976       11.97       2.97       37       14       2.97       2.62       2.3%       -2.03 (3.54, -0.52)         Fortin 1976       6.35       2.31       37       6.44       1.61       32       3.7%       -0.09 [1.02, 0.84]         Giraudt 2003       8.1       2.6       48       7.9       2.4       52       3.6%       0.20 [-0.76, 1.16]         Huzebos 2006a       7.93       1.94       14       9.92       5.78       12       0.7%       -1.99 [5.41, 1.43]         Lang 2001       7       1       30       8       2.97       14       1.4%       -0.00 [-3.06, 1.16]         Leserman 1989       8.8       2.97       13       9.6       2.97       14       1.4%       -0.00 [-3.01, 1.44]         Leserman 1989       8.8       2.97       13       9.6       2.97       14       1.4%       -0.80 [-3.01, 1.44]         Lin 2005       1.4.09       6.77       32       3.11       1.8       3.9%       0.05 [-0.81, 0.91]	Doering 2000	11.5	2.97	46	11.2	2.97	54	3.1%	0.30 [-0.87, 1.47]	_ <del></del>
Formin 1976       6.35       2.31       37       6.44       1.61       32       3.7%       -0.09 [1.02, 0.84]         Furze 2009       7.61       2.69       100       8.28       4.96       104       3.3%       -0.067 [1.76, 0.42]         Graudet 2003       8.1       2.5       48       7.9       2.4       52       3.6%       -0.021 [-0.76, 1.16]         Hutzebos 2006a       7.93       1.94       14       9.92       5.78       12       0.7%       -1.99 [-5.41, 1.43]         Lam 2001       7       1       30       8       2.97       15       2.0%       -1.24 [-2.98, 0.50]         Leserman 1989       8.8       2.97       13       9.6       2.97       15       2.0%       -0.80 [-3.04, 1.44]         Levin 1987       7.563       2.331       16       8.37       3.148       17       1.8%       -0.80 [-3.04, 1.44]         Levin 1987       5.035       1.048       19       6.04       1.7       10       3.148       17       1.0%       -1.00 [-2.16, 0.15]         Maher 1995       5.035       1.048       19       6.04       1.7       10       3.1%       -1.00 [-2.16, 0.15]         Mahler 1998       1.24<	Felton 1976	11.97	2.97	37	14	2.97	25	2.3%	-2.03 [-3.54, -0.52]	
Furze 2009       7.61       2.69       100       8.28       4.96       104       3.3% $-0.67[+1.76], 0.42]$ Giraudet 2003       8.1       2.5       48       7.9       2.4       52       3.6%       0.20[-0.76], 1.16]         Lam 2001       7       1       30       8       2       30       4.14       9.92       5.78       12       0.7% $-1.99[-5.41, 1.43]$ Lam 2001       7       1       30       8       2.30       4.1% $-0.00[-1.80, -0.20]$ Langer 1975       6.36       2.97       14       0.4% $-0.80[-3.04, 1.44]$ Lewin 1987       7.563       2.331       16       8.371       3.148       17       1.8% $-0.81[-2.68, 1.07]$ Lin 2005       14.09       6.77       32       1.41       6.12       30       0.92[-3.2], 2.01         Lindeman 1973       6.7       2.56       90       6.65       3.18       86       3.9%       0.05[-0.81, 0.91]         Mahler 1998       6.183       0.41       190       7.14       0.6       67       5.7% $-0.30[-1.48, 0.88]$ Rajendran 1998       12.4       3.6       2.67       2.0	Fortin 1976	6.35	2.31	37	6.44	1.61	32	3.7%	-0.09 [-1.02, 0.84]	-+-
Giraudet 2003       8.1       2.5       48       7.9       2.4       52       3.6%       0.20 [-0.76, 1.16]         Hulzebos 2006a       7.93       1.94       14       9.92       5.78       12       0.7%       -1.99 [-5.41, 1.43]         Lam 2001       7       1       30       8       2       30       4.1%       -1.00 [-1.80, -0.20]         Langer 1975       6.36       2.97       14       1.4%       -0.80 [-3.04, 1.44]         Lewin 1987       7.563       2.331       16       8.371       3.148       17       1.8%       -0.81 [-2.69, 1.07]         Lin 2005       14.09       6.77       32       14.1       6.12       30       0.8%       -0.01 [-3.22, 3.20]         Mahler 1995       5.035       1.048       19       6.04       1.7       10       3.1%       -1.00 [-2.16, 0.15]         Mahler 1995       5.035       1.048       19       6.04       1.7       10       3.1%       -1.00 [-2.16, 0.15]         Mahler 1998       6.183       0.41       190       7.14       0.6       67       5.7%       -0.96 [-1.11, -0.80]         McGregor 2004       15       2.97       20       1.60       0.00 [-0.4, 9, -10]	Furze 2009	7.61	2.69	100	8.28	4.96	104	3.3%	-0.67 [-1.76, 0.42]	_++_
Hulzebos 2006a       7.93       1.94       14       9.92       5.78       12 $0.7\%$ $-1.99[5.41, 1.43]$ Lam 2001       7       1       30       8       2       30 $4.1\%$ $-1.00[1.80, -0.20]$ Langer 1975       6.36       2.97       14 $7.6$ $2.97$ $14$ $1.4\%$ $-0.80[3.04, 1.44]$ Lewin 1987       7.563 $2.331$ 16 $8.371$ $3.148$ $17$ $1.8\%$ $-0.81[2.69, 1.07]$ Lin 2005       14.09 $6.77$ $32$ $14.1$ $6.12$ $3.9\%$ $-0.01[3.22, 3.20]$ Lindeman 1973 $6.7$ $2.56$ $90$ $6.65$ $3.18$ $86$ $3.9\%$ $-0.05[0.81, 0.91]$ Mahler 1998 $6.183$ $0.41$ $190$ $7.14$ $0.6$ $75$ $-0.30[1.41, 0.80]$ $*$ Ridgeway 1982 $10.325$ $2.97$ $20$ $1.6\%$ $-3.00[4.99, -1.01]$ $-1.4\%$ Schmitt 1973 $1.8$ $2.97$ $20$ $2.2\%$ $0.30[1.48, 0.88]$ $-1.00[-9.42, -2.98]$ Subuldham 2002 $10.07$ $5.14$	Giraudet 2003	8.1	2.5	48	7.9	2.4	52	3.6%	0.20 [-0.76, 1.16]	- <b>-</b> -
Lam 2001 7 1 30 8 2 30 4.1% $-1.00 [-1.80, -0.20]$ Langer 1975 6.36 2.97 44 7.6 2.97 15 2.0% $-1.24 [-2.88, 0.50]$ Leserman 1989 8.8 2.97 13 9.6 2.97 14 1.4% $-0.80 [-3.04, 1.44]$ Levin 1987 7.563 2.331 16 8.371 3.148 17 1.8% $-0.81 [-2.68, 1.07]$ Lin 2005 14.09 6.77 32 14.1 6.12 30 0.8% $-0.01 [-3.22, 3.20]$ Lin 2005 14.09 6.77 32 14.1 6.12 30 0.8% $-0.01 [-3.22, 3.20]$ Mahler 1995 5.035 1.048 19 6.04 1.7 10 3.1% $-1.00 [-1.16, 0.15]$ Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% $-0.96 [-1.11, -0.80]$ Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% $-0.96 [-1.11, -0.80]$ Magendran 1998 12.4 3.6 25 18.6 6.6 20 0.7% $-6.20 [-9.42, -2.98]$ Ridgeway 1982 10.325 2.97 40 8.82 2.97 20 2.2% 1.50 [-0.99, 3.10] Schmitt 1973 11.8 2.97 25 11.8 2.97 25 2.1% 0.00 [-1.65, 1.65] Shuldham 2002 10.07 5.04 162 9.15 4.38 152 3.4% $0.92 [-0.12, 1.96]$ Watt-Watson 2000 5.585 1.292 29 5.13 0.99 16 4.5% 0.46 [-0.22, 1.13] Watt-Watson 2000 5.585 1.292 29 5.13 0.99 16 4.5% 0.46 [-0.22, 1.13] Watt-Watson 2000 5.685 1.292 29 5.13 0.99 16 4.5% 0.46 [-0.22, 1.13] Watt-Watson 2004 6.8 5.9 202 6.6 3.1 204 3.7% 0.20 [-0.72, 1.2] Total (95% CI) 1803 150 100.0% -0.52 [-0.82, -0.23] Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.0001); I <sup>2</sup> = 74%	Hulzebos 2006a	7.93	1.94	14	9.92	5.78	12	0.7%	-1.99 [-5.41, 1.43]	
Langer 1975 6.36 2.97 44 7.6 2.97 15 2.0% $-1.24$ [2.98, 0.50] Lesseman 1989 8.8 2.97 13 9.6 2.97 14 1.4% $-0.80$ [3.04, 1.44] Levin 1987 7.563 2.331 16 8.371 3.148 17 1.8% $-0.81$ [2.08, 1.07] Lin 2005 14.09 6.77 32 14.1 6.12 30 0.8% $-0.01$ [-3.22, 3.20] Lin deman 1973 6.7 2.56 90 6.65 3.18 86 3.9% $0.05$ [-0.81, 0.91] Mahler 1995 5.035 1.048 19 6.04 1.7 10 3.1% $-1.00$ [-2.16, 0.15] Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% $-0.96$ [-1.11, -0.80] McGregor 2004 15 2.97 15 18 2.97 20 1.6% $-3.00$ [-4.49, -1.01] Oosting 2012 5.1 1 14 4 5.4 2.1 15 3.0% $-0.30$ [-1.48, 0.88] Rajendran 1998 12.4 3.6 25 18.6 6.6 20 0.7% $-6.20$ [-9.42, -2.98] Ridgeway 1982 10.325 2.97 40 8.82 2.97 20 2.2% 1.50 [-0.09, 3.10] Schmitt 1973 11.8 2.97 25 18.8 152 3.4% 0.92 [-0.12, 1.96] Watt-Watson 2000 5.585 1.292 29 5.13 0.99 16 4.5% 0.46 [-0.22, 1.13] Watt-Watson 2000 5.585 1.292 29 5.13 0.99 16 4.5% 0.46 [-0.22, 1.12] Wilson 1981 6.962 1.366 54 7.947 1.434 18 4.2% $-0.99$ [1.74, -0.23] Zhang 2012 7.5 0.8 20 9.6 1.7 20 4.0% $-2.10$ [-2.92, -1.28] Zhemer 1982 8.12 3.563 71 9.08 3.563 40 2.6% $-0.96$ [-2.34, 0.42] Zhemer 1982 8.12 3.563 71 9.08 3.56 3.40 2.6% $-0.96$ [-2.34, 0.42] Total (95% CI) 1803 1510 100.% $-0.52$ [-0.82, -0.22]	Lam 2001	7	1	30	8	2	30	4.1%	-1.00 [-1.80, -0.20]	
Leserman 1989 8.8 2.97 13 9.6 2.97 14 1.4% $-0.80[-3.04, 1.44]$ Levin 1987 7.563 2.331 16 8.371 3.148 17 1.8% $-0.81[-2.69, 1.07]$ Lin 2005 14.09 6.77 32 14.1 6.12 30 0.8% $-0.01[-3.22, 3.20]$ Lindeman 1973 6.7 2.56 90 6.65 3.18 86 3.9% $0.05[-0.81, 0.91]$ Mahler 1995 5.035 1.048 19 6.04 1.7 10 3.1% $-1.00[-2.16, 0.15]$ Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% $-0.96[-1.11, -0.80]$ MacGregor 2004 15 2.97 15 18 2.97 20 1.6% $-3.00[-4.99, -1.01]$ Oosting 2012 5.1 1 14 5.4 2.1 15 3.0% $-0.30[-4.49, -4.01]$ Rajendran 1998 12.4 3.6 25 18.6 6.6 20 0.7% $-6.20[-9.42, -2.98]$ Rajendran 1998 12.4 3.6 25 18.6 8.6 20 0.7% $-6.20[-9.42, -2.98]$ Rajendran 1998 12.4 3.6 25 18.8 152 3.4% $0.00[-1.65, 1.65]$ Shuldham 2002 10.07 5.04 162 9.15 4.38 152 3.4% $0.92[-0.12, 1.96]$ Watt-Watson 2000 5.585 1.292 29 5.13 0.99 16 4.5% $0.46[-0.22, 1.13]$ Watt-Watson 2004 6.8 5.9 202 6.6 3.1 204 3.7% $0.20[-0.72, 1.12]$ Wilson 1981 6.962 1.366 54 7.947 1.434 18 4.2% $-0.99[-1.74, -0.23]$ Watt-Watson 2004 6.8 5.9 202 6.6 3.1 204 3.7% $0.20[-0.72, 1.12]$ Wilson 1981 6.962 1.366 54 7.947 1.434 18 4.2% $-0.99[-1.74, -0.23]$ Linere 1982 8.12 3.563 71 9.08 3.563 40 2.6% $-0.96[-2.4, 0.42]$ Linere 1982 8.12 3.563 71 9.08 3.563 40 2.6% $-0.96[-2.4, 0.42]$ Lierer 2007 3 2 50 3 2 50 4.1% $0.00[-0.78, 0.78]$ Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); P = 74%	Langer 1975	6.36	2.97	44	7.6	2.97	15	2.0%	-1.24 [-2.98, 0.50]	
Levin 1987 7.563 2.331 16 8.371 3.148 17 1.8% $-0.81[-2.69, 1.07]$ Lin 2005 14.09 6.77 32 14.1 6.12 30 0.8% $-0.01[-3.22, 3.20]$ Mahler 1995 5.035 1.048 19 6.06 3.18 86 3.9% $0.05[-0.81, 0.91]$ Mahler 1995 5.035 1.048 19 6.04 1.7 10 3.1% $-1.00[-2.16, 0.15]$ Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% $-0.96[-1.11, -0.80]$ McGregor 2004 15 2.97 15 18 2.97 20 1.6% $-3.00[-4.99, -1.01]$ Oosting 2012 5.1 1 14 5.4 2.1 15 3.0% $-0.30[-1.48, 0.88]$ Rajendran 1998 12.4 3.6 25 18.6 6.6 20 0.7% $-6.20[-9.42, -2.98]$ Ridgeway 1982 10.325 2.97 40 8.82 2.97 20 2.2% 1.50[-0.93, 3.10] Schmitt 1973 11.8 2.97 25 11.8 2.97 25 2.1% 0.00[-1.65, 1.65] Shuldham 2002 10.07 5.04 162 9.15 4.38 152 3.4% 0.92[-0.12, 1.96] Watt-Watson 2000 5.585 1.292 29 5.13 0.99 16 4.5% 0.46[-0.22, 1.13] Watt-Watson 2004 6.8 5.9 202 6.6 3.1 204 3.7% 0.20[-0.72, 1.12] Wilson 1981 6.962 1.366 54 7.947 1.434 18 4.2% $-0.99[-1.74, -0.23]$ Zhemer 1982 8.12 3.663 71 9.08 3.563 40 2.6% $-0.96[-2.34, 0.42]$ Zieren 2007 3 2 50 3 2 50 4.1% 0.00[-0.78, 0.78] Total (95% CI) 1803 1510 100.% $-0.52[-0.82, -0.22]$	Leserman 1989	8.8	2.97	13	9.6	2.97	14	1.4%	-0.80 [-3.04, 1.44]	
Lin 2005 14.09 6.77 32 14.1 6.12 30 0.8% -0.01 [ $3.22, 3.20$ ] Lindeman 1973 6.7 2.56 90 6.65 3.18 86 3.9% 0.05 [ $-0.81, 0.91$ ] Mahler 1995 5.035 1.048 19 6.04 1.7 10 3.1% -1.00 [ $-2.16, 0.15$ ] Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% -0.96 [ $-1.11, -0.80$ ] McGregor 2004 15 2.97 15 18 2.97 20 1.6% -3.00 [ $-4.99, -1.01$ ] Oosting 2012 5.1 1 14 5.4 2.1 15 3.0% -0.30 [ $-1.48, 0.88$ ] Ridgeway 1982 10.325 2.97 40 8.82 2.97 20 2.2% 1.50 [ $-0.99, 3.10$ ] Schmitt 1973 11.8 2.97 25 11.8 2.97 25 2.1% 0.00 [ $-1.65, 1.65$ ] Shuldham 2002 10.07 5.04 162 9.15 4.38 152 3.4% 0.92 [ $-0.12, 1.96$ ] Watt-Watson 2000 5.585 1.292 29 5.13 0.99 16 4.5% 0.46 [ $-0.22, 1.13$ ] Watt-Watson 2004 6.8 5.9 202 6.6 3.1 204 3.7% 0.20 [ $-0.72, 1.12$ ] Witson 1981 6.962 1.366 54 7.947 1.434 18 4.2% -0.99 [ $-1.74, -0.23$ ] Zhang 2012 7.5 0.8 20 9.6 1.7 20 4.0% -2.10 [ $-2.92, -1.28$ ] Zierer 1982 8.12 3.563 71 9.08 3.563 40 2.6% -0.96 [ $-2.34, 0.42$ ] Zierer 1982 8.12 3.563 71 9.08 3.563 40 2.6% -0.96 [ $-2.34, 0.42$ ] Zierer 1982 8.12 3.563 71 9.08 3.563 40 2.6% -0.96 [ $-2.34, 0.42$ ] Zierer 1982 8.12 3.563 71 9.08 3.563 40 2.6% -0.96 [ $-2.34, 0.42$ ] Total (95% CI) 1803 1510 100.% -0.52 [ $-0.82, -0.22$ ]	Levin 1987	7.563	2.331	16	8.371	3.148	17	1.8%	-0.81 [-2.69, 1.07]	
Lindeman 1973 6.7 2.56 90 6.65 3.18 86 3.9% $0.05[0.81, 0.91]$ Mahler 1995 5.035 1.048 19 6.04 1.7 10 3.1% -1.00[2.16, 0.15] Mahler 1998 6.183 0.41 190 7.14 0.6 67 5.7% -0.96[-1.11, -0.80] McGregor 2004 15 2.97 15 18 2.97 20 1.6% -3.00[-4.99, -1.01] Oosting 2012 5.1 1 14 5.4 2.1 15 3.0% -0.30[-1.48, 0.88] Rajendran 1998 12.4 3.6 25 18.6 6.6 20 0.7% -6.20[-9.42, -2.98] Ridgeway 1982 10.325 2.97 40 8.82 2.97 20 2.2% 1.50[-0.9, 3.10] Schmitt 1973 11.8 2.97 25 11.8 2.97 25 2.1% 0.00[-1.65, 1.65] Shuldham 2002 10.07 5.04 162 9.15 4.38 152 3.4% 0.92[-0.12, 1.96] Watt-Watson 2000 5.585 1.292 29 5.13 0.99 16 4.5% 0.46 [-0.22, 1.13] Watt-Watson 2004 6.8 5.9 202 6.6 3.1 204 3.7% 0.20 [-0.72, 1.12] Wilson 1981 6.962 1.366 54 7.947 1.434 18 4.2% -0.99 [-1.74, -0.23] Zhang 2012 7.5 0.8 20 9.6 1.7 20 4.0% -2.10 [-2.92, -1.28] Ziemer 1982 8.12 3.563 71 9.08 3.563 40 2.6% -0.96 [-2.34, 0.42] Ziemer 1982 8.12 3.563 71 9.08 3.563 40 2.6% -0.96 [-2.34, 0.42] Ziemer 1982 8.12 3.563 71 9.08 3.563 40 2.6% -0.96 [-2.34, 0.42] Ziemer 1982 8.12 3.563 71 9.08 3.563 40 2.6% -0.96 [-2.34, 0.42] Ziemer 1982 8.12 3.563 71 9.08 3.563 40 2.6% -0.96 [-2.34, 0.42] Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); P = 74%	Lin 2005	14.09	6.77	32	14.1	6.12	30	0.8%	-0.01 [-3.22, 3.20]	
Mahler 1995       5.035       1.048       19       6.04       1.7       10       3.1%       -1.00 [-2.16, 0.15]         Mahler 1998       6.183       0.41       190       7.14       0.6       67       5.7%       -0.96 [-1.11, -0.80]         McGregor 2004       15       2.97       15       18       2.97       20       1.6%       -3.00 [-4.99, -1.01]         Oosting 2012       5.1       1       14       5.4       2.1       15       3.0%       -0.30 [-1.48, 0.88]         Rajendran 1998       12.4       3.6       25       18.6       6.6       20       0.7%       -6.20 [-9.42, -2.98]         Ridgeway 1982       10.325       2.97       40       8.82       2.97       20       2.2%       1.50 [-0.09, 3.10]         Schmitt 1973       11.8       2.97       25       2.1%       0.00 [-1.65, 1.65]	Lindeman 1973	6.7	2.56	90	6.65	3.18	86	3.9%	0.05 [-0.81, 0.91]	_ <del></del>
Mahler 1998       6.183       0.41       190       7.14       0.6       67       5.7%       -0.96 [+1.11, -0.80]         McGregor 2004       15       2.97       15       18       2.97       20       1.6%       -3.00 [-4.99, -1.01]         Oosting 2012       5.1       1       14       5.4       2.1       15       3.0%       -0.30 [-1.48, 0.88]         Rajendran 1998       12.4       3.6       25       18.6       6.6       20       0.7%       -6.20 [-9.42, -2.98]         Schmitt 1973       11.8       2.97       25       1.50 [-0.09, 3.10]	Mahler 1995	5.035	1.048	19	6.04	1.7	10	3.1%	-1.00 [-2.16, 0.15]	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Mahler 1998	6.183	0.41	190	7.14	0.6	67	5.7%	-0.96 [-1.11, -0.80]	•
Oosting 2012       5.1       1       14       5.4       2.1       15       3.0%       -0.30 [-1.48, 0.88]         Rajendran 1998       12.4       3.6       25       18.6       6.6       20       0.7%       -6.20 [-9.42, -2.98]         Ridgeway 1982       10.325       2.97       40       8.82       2.97       20       2.2%       1.50 [-0.09, 3.10]         Schmitt 1973       11.8       2.97       25       2.1%       0.00 [-1.65, 1.65]         Shuldham 2002       10.07       5.04       162       9.15       4.38       152       3.4%       0.92 [-0.12, 1.16]         Watt-Watson 2000       5.585       1.292       29       5.13       0.99       16       4.5%       0.46 [-0.22, 1.13]         Watt-Watson 2004       6.8       5.9       202       6.6       3.1       204       3.7%       0.20 [-0.72, 1.12]         Wilson 1981       6.962       1.366       54       7.947       1.434       18       4.2%       -0.99 [-1.74, -0.23]         Zieren 1982       8.12       3.563       71       9.08       3.563       40       2.6%       -0.96 [-2.34, 0.42]	McGregor 2004	15	2.97	15	18	2.97	20	1.6%	-3.00 [-4.99, -1.01]	
Rajendran 199812.43.62518.66.620 $0.7\%$ $-6.20[-9.42, -2.98]$ Ridgeway 198210.3252.97408.822.97202.2%1.50[-0.09, 3.10]Schmitt 197311.82.972511.82.97252.1%0.00[-1.65, 1.65]Shuldham 200210.075.041629.154.381523.4%0.92[-0.12, 1.96]Watt-Watson 20005.5851.292295.130.99164.5%0.46 [-0.22, 1.13]Watt-Watson 20046.85.92026.63.12043.7%0.20 [-0.72, 1.12]Wilson 19816.9621.366547.9471.434184.2%-0.99 [-1.74, -0.23]Zhang 20127.50.8209.61.7204.0%-2.10 [-2.92, -1.28]Zieren 19828.123.563719.083.563402.6%-0.96 [-2.34, 0.42]Zieren 2007325032504.1%0.00 [-0.78, 0.78]Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); I <sup>2</sup> = 74%1510100.0%-0.52 [-0.82, -0.22]	Oosting 2012	5.1	1	14	5.4	2.1	15	3.0%	-0.30 [-1.48, 0.88]	
Ridgeway 1982       10.325       2.97       40       8.82       2.97       20       2.2%       1.50 [-0.09, 3.10]         Schmitt 1973       11.8       2.97       25       11.8       2.97       25       2.1%       0.00 [-1.65, 1.65]         Shuldham 2002       10.07       5.04       162       9.15       4.38       152       3.4%       0.92 [-0.12, 1.96]         Watt-Watson 2000       5.585       1.292       29       5.13       0.99       16       4.5%       0.46 [-0.22, 1.13]         Watt-Watson 2004       6.8       5.9       202       6.6       3.1       204       3.7%       0.20 [-0.72, 1.12]         Wilson 1981       6.962       1.366       54       7.947       1.434       18       4.2%       -0.99 [-1.74, -0.23]         Ziemer 1982       8.12       3.563       71       9.08       3.563       40       2.6%       -0.96 [-2.34, 0.42]	Rajendran 1998	12.4	3.6	25	18.6	6.6	20	0.7%	-6.20 [-9.42, -2.98]	
Schmitt 1973       11.8       2.97       25       11.8       2.97       25       2.1%       0.00 [-1.65, 1.65]         Shuldham 2002       10.07       5.04       162       9.15       4.38       152       3.4%       0.92 [-0.12, 1.96]         Watt-Watson 2000       5.585       1.292       29       5.13       0.99       16       4.5%       0.46 [-0.22, 1.13]         Watt-Watson 2004       6.8       5.9       202       6.6       3.1       204       3.7%       0.20 [-0.72, 1.12]         Wilson 1981       6.962       1.366       54       7.947       1.434       18       4.2%       -0.99 [-1.74, -0.23]         Zhang 2012       7.5       0.8       20       9.6       1.7       20       4.0%       -2.10 [-2.92, -1.28]         Ziemer 1982       8.12       3.563       71       9.08       3.563       40       2.6%       -0.96 [-2.34, 0.42]	Ridgeway 1982	10.325	2.97	40	8.82	2.97	20	2.2%	1.50 [-0.09, 3.10]	
Shuldham 2002       10.07       5.04       162       9.15       4.38       152       3.4%       0.92 [-0.12, 1.96]         Watt-Watson 2000       5.585       1.292       29       5.13       0.99       16       4.5%       0.46 [-0.22, 1.13]         Watt-Watson 2004       6.8       5.9       202       6.6       3.1       204       3.7%       0.20 [-0.72, 1.12]         Wilson 1981       6.962       1.366       54       7.947       1.434       18       4.2%       -0.99 [-1.74, -0.23]         Zhang 2012       7.5       0.8       20       9.6       1.7       20       4.0%       -2.10 [-2.92, -1.28]         Ziemer 1982       8.12       3.563       71       9.08       3.563       40       2.6%       -0.96 [-2.34, 0.42]         Zieren 2007       3       2       50       3       2       50       4.1%       0.00 [-0.78, 0.78]         Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); I <sup>2</sup> = 74%       1510       100.0%       -0.52 [-0.82, -0.22]       -10       -5       0       5	Schmitt 1973	11.8	2.97	25	11.8	2.97	25	2.1%	0.00 [-1.65, 1.65]	
Watt-Watson 2000 $5.585$ $1.292$ $29$ $5.13$ $0.99$ $16$ $4.5\%$ $0.46$ $[-0.22, 1.13]$ Watt-Watson 2004 $6.8$ $5.9$ $202$ $6.6$ $3.1$ $204$ $3.7\%$ $0.20$ $[-0.72, 1.12]$ Wilson 1981 $6.962$ $1.366$ $54$ $7.947$ $1.434$ $18$ $4.2\%$ $-0.99$ $[-1.74, -0.23]$ Zhang 2012 $7.5$ $0.8$ $20$ $9.6$ $1.7$ $20$ $4.0\%$ $-2.10$ $[-2.92, -1.28]$ Ziemer 1982 $8.12$ $3.563$ $71$ $9.08$ $3.563$ $40$ $2.6\%$ $-0.96$ $[-2.34, 0.42]$ Zieren 2007 $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $150$	Shuldham 2002	10.07	5.04	162	9.15	4.38	152	3.4%	0.92 [-0.12, 1.96]	
Watt-Watson 2004 $6.8$ $5.9$ $202$ $6.6$ $3.1$ $204$ $3.7\%$ $0.20$ $[-0.72, 1.12]$ Wilson 1981 $6.962$ $1.366$ $54$ $7.947$ $1.434$ $18$ $4.2\%$ $-0.99$ $[-1.74, -0.23]$ Zhang 2012 $7.5$ $0.8$ $20$ $9.6$ $1.7$ $20$ $4.0\%$ $-2.10$ $[-2.92, -1.28]$ Ziemer 1982 $8.12$ $3.563$ $71$ $9.08$ $3.563$ $40$ $2.6\%$ $-0.96$ $[-2.34, 0.42]$ Zieren 2007 $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $50$ $3$ $2$ $6.96$ $2.0\%$ $7.5\%$ $0.00$ $[-0.78, 0.78]$ Total (95% Cl) $1803$ $1510$ $100.0\%$ $-0.52$ $[-0.82, -0.22]$ $-10$ $-5$ $0$ $5$ Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < $0.00001$ ); I <sup>2</sup> = 74\% $-10$ $-5$ $0$ $5$	Watt-Watson 2000	5.585	1.292	29	5.13	0.99	16	4.5%	0.46 [-0.22, 1.13]	
Wilson 1981       6.962       1.366       54       7.947       1.434       18       4.2%       -0.99 [1.74, -0.23]         Zhang 2012       7.5       0.8       20       9.6       1.7       20       4.0%       -2.10 [-2.92, -1.28]         Ziemer 1982       8.12       3.563       71       9.08       3.563       40       2.6%       -0.96 [-2.34, 0.42]         Zieren 2007       3       2       50       3       2       50       4.1%       0.00 [-0.78, 0.78]         Total (95% Cl)       1803       1510       100.0%       -0.52 [-0.82, -0.22]       +         Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); I <sup>2</sup> = 74%       -       -       -       -       -	Watt-Watson 2004	6.8	5.9	202	6.6	3.1	204	3.7%	0.20 [-0.72, 1.12]	_ <b>_</b>
Zhang 2012       7.5       0.8       20       9.6       1.7       20       4.0%       -2.10 [-2.92, -1.28]         Ziemer 1982       8.12       3.563       71       9.08       3.563       40       2.6%       -0.96 [-2.34, 0.42]         Zieren 2007       3       2       50       3       2       50       4.1%       0.00 [-0.78, 0.78]         Total (95% Cl)       1803       1510       100.0%       -0.52 [-0.82, -0.22] $\bullet$ Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); I <sup>2</sup> = 74%	Wilson 1981	6.962	1.366	54	7.947	1.434	18	4.2%	-0.99 [-1.74, -0.23]	
Ziemer 1982       8.12       3.563       71       9.08       3.563       40       2.6%       -0.96       [-2.34, 0.42]         Zieren 2007       3       2       50       3       2       50       4.1%       0.00       [-0.78, 0.78]         Total (95% Cl)       1803       1510       100.0%       -0.52       [-0.82, -0.22]       ♦         Heterogeneity: Tau² = 0.40; Chi² = 129.00, df = 34 (P < 0.00001); I² = 74%	Zhang 2012	7.5	0.8	20	9.6	1.7	20	4.0%	-2.10 [-2.92, -1.28]	- <b>-</b>
Zieren 2007       3       2       50       3       2       50       4.1%       0.00 [-0.78]       4.1%         Total (95% Cl)       1803       1510       100.0%       -0.52 [-0.82, -0.22]       ↓         Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); I <sup>2</sup> = 74%       -10       -5       0       5	Ziemer 1982	8.12	3.563	71	9.08	3.563	40	2.6%	-0.96 [-2.34, 0.42]	+
Total (95% Cl)       1803       1510       100.0%       -0.52 [-0.82, -0.22]         Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); I <sup>2</sup> = 74%       -10       -5       0       5	Zieren 2007	3	2	50	3	2	50	4.1%	0.00 [-0.78, 0.78]	-+-
Heterogeneity: Tau <sup>2</sup> = 0.40; Chi <sup>2</sup> = 129.00, df = 34 (P < 0.00001); l <sup>2</sup> = 74% $-10$ -5 0 5	Total (95% CI)			1803			1510	100.0%	-0.52 [-0.82, -0.22]	•
	Heterogeneity: Tau <sup>2</sup> = 0.4	40; Chi² = 129	.00, df= 34	(P < 0.00	0001); I <b>²</b> =	= 74%				

Heterogeneity: Tau<sup>2</sup> = 0.40; Chi<sup>2</sup> = 129.00, df = 34 (P < 0.00001); l<sup>2</sup> = 74% Test for overall effect: Z = 3.39 (P = 0.0007)



### **Cochrane Review Meta-analysis Results**

- Post-surgery, compared with controls, patients receiving interventions experienced:
  - **Lower pain** (Hedges' g = -0.20, 95%CI: -0.35 to -0.06)
  - Lower negative emotion (Hedges' g = -0.35, 95%CI: -0.54 to -0.16)
  - Shorter length of stay (mean difference = -0.52 days, 95% CI -0.82 to -0.22).
- **High heterogeneity** studies not very similar (different interventions, surgical populations).



## **Limitations of analysis**

• Could not effectively unpick impact of individual intervention components.

-Interventions comprised 1 to 4 components.

• Need to explore causes of heterogeneity.

### Secondary analysis: Network meta-analysis

- Statistical model using direct evidence (where two components are directly compared) and indirect evidence (where two components are each compared with a third treatment).
- Outcome: estimate effects for each comparison, whether or not the treatments have been directly compared.
- Can examine potential causes of heterogeneity (e.g. control group mean, type of surgery).
- Bayesian framework in WinBUGS v1.4.3.

Freeman, S.C., Scott, N.W., Powell, R., Johnston, M., Sutton, A.J., Cooper, N.J. (In prep).

#### Length of stay network diagram



P = procedural information; S = sensory information; B = behavioural instruction; C = cognitive intervention; R = relaxation; E = emotion-focussed

#### Models

- Model 1: as for Cochrane review compares all interventions with control.
- Model 2: each component has separate effect; total effect of an intervention = sum of component effects (e.g. P+S).
- Model 3: model 2 plus combinations of components (pairs of components when combined may have larger/smaller effect than if effects summed)(e.g. P+S+PS).
- Model 4: each possible combination treated as a separate intervention.

#### Model 2: role of components

- Procedural info, Sensory info, Behavioural instruction, Cognitive intervention & Relaxation each reduced length of stay; greatest effects:
  - Relaxation (MD -0.48, Crl: -1.35, 0.36) and
  - Behavioural instruction (MD -0.42, 95%Crl: -0.97, 0.06).
- In linear combination, reduction of approximately 1 day for

- P+S+B (MD -0.96, 95% Crl: -1.62, -0.35) and

- P+S+R (MD -1.02, 95%Crl: -2.00, -0.05).

• Evidence of heterogeneity ( $\tau$ =0.81).

## **Causes of heterogeneity 1**

- Control group mean length of stay included as continuous covariate
  - Control for typical length of stay for that operation, at that time, in that context.
  - For every 1 day increase control LoS, mean reduction of 0.10 days in intervention group LoS (95%Crl -0.16, -0.04)
  - As control LoS increases, benefit of intervention on LoS increases.
  - Slightly reduced heterogeneity ( $\tau$  =0.76).

### **Causes of heterogeneity 2**

- Type of surgery: cardiovascular / orthopaedic / 'other'
  - Reduced heterogeneity ( $\tau$ =0.68)
  - Procedural info = most effective intervention for orthopaedic surgery (MD -3.63 95%Crl -5.87, -1.34);
  - Sensory info for cardiovascular surgery (MD-1.50, 95%Crl- 3.12, 0.13)
  - Behavioural instruction for 'other' surgery (MD -1.06, 95% Crl -1.93, -0.30)
- Including type of surgery AND control group mean reduced heterogeneity further (τ=0.54).

#### Conclusions

- Component network meta-analysis → quantify effects for individual intervention components (not possible with standard Cochrane analysis).
- Possible to control for other covariates to further understand heterogeneity.
- Can model how effects of intervention components vary with covariates.