Table 1. Characteristics of included systematic reviews.

		Search and eligibility criteria				Characteristics of included RCTs			
Study	**Objective**	**No. data-bases searched**	**Grey literature 1=yes**	**Years searched**	**Population (e.g., age)**	**No. RCTs**	**No. parti-cipants**	**Outcome**	**Quality appraisal: tool/rating (#RCTs)**
Abbott 2019	To determine the effects of robopets on the health and well-being of older people living in care homes.	13	0	Inception-2018	Older people living in care homes/residential care	2	82	Loneliness	NR/Low, high RoB
Barnett 2020	To synthesize evidence to improve social circumstances across eight social domains in people with mental health conditions.	6	0	2000-2020	Adults aged 18+ with any mental health condition. Only high-income countries.	23	2,550	Objective/ subjective (incl. loneliness) isolation	Cochrane RoB Tool/ Low (4), moderate (12), high (4) RoB [2]
Choi 2021	To investigate the development trend of information communication technology interventions designed for the elderly.	3	0	2003-2019	Older people 60+	3	370	Loneliness	Cochrane RoB Tool/ NA[1]
Christensen 2021	To evaluate and compare the effectiveness of different interventions to reduce loneliness.	6	1	1980-2020	All ages	54	6,379	Loneliness	Cochrane RoB Tool/ Low (12), moderate (33), high quality (9). GRADE Low (≤4 weeks)[5] and moderate (5-26 weeks
Eccles 2021	To examine the effect of interventions to reduce loneliness in young people, and moderators of the effects	4	0	1980-Jan 2020	Age ≤25	25	6,750	Loneliness	Tools created by the National Heart, Lung, and Blood Institute and Research Triangle Institute International/Poor (11), fair (7), good (7) [6]
Forsman 2018	To assess the effectiveness of technology-based	7	1	2003-2014	Age 65+ or age 55+ and retired	6	752	Loneliness	NICE/Poor (2), fair (2), good (2)

		Search and eligibility criteria				Characteristics of included RCTs			
Study	**Objective**	**No. data-bases searched**	**Grey literature 1=yes**	**Years searched**	**Population (e.g., age)**	**No. RCTs**	**No. parti-cipants**	**Outcome**	**Quality appraisal: tool/rating (#RCTs)**
	interventions in promoting the mental health and wellbeing of older adults.								
Fu 2022	To evaluate the effects of remotely delivered intervention on loneliness among older adults.	5	0	Inception-July 2021	Age 65+	13	1,045	Loneliness	Cochrane RoB tool/NA[1,2]
Gardiner 2018	To determine the effectiveness of interventions targeting loneliness and social isolation.	6	1	2003-2016	Age 55+	6	1,112	Loneliness, social isolation	Hierarchy of evidence (score 3 to 9 (high quality)). Studies with score<4 excluded/Scores 7 (1), 8 (1), and 9 (4) [7]
Heins 2021	To provide a comprehensive overview of the effects of technological interventions that address social participation in community-dwelling older adults with dementia.	5	0	2000-June 2020	Community-dwelling adults aged 55+	3	170	Loneliness, social interaction	Effective Public Health Practice Project/Moderate to strong quality.
Hickin 2021	To explore the effect of psychological interventions to reduce loneliness across the lifespan, and the moderator of this effectiveness.	5	0	2000-2020	Entire population, age range 8-80; Mean 45	31	3,959	Loneliness	Cochrane RoB Tool/Low risk (9), some concerns (12), high risk (10).
Jin 2021	To determine the effectiveness of technology-based interventions for	7	0	Inception-April 2021	Age 60+	6	391	Loneliness	Cochrane RoB Tool/Low (3) and moderate (3) quality

		Search and eligibility criteria				Characteristics of included RCTs			
Study	**Objective**	**No. data-bases searched**	**Grey literature 1=yes**	**Years searched**	**Population (e.g., age)**	**No. RCTs**	**No. parti-cipants**	**Outcome**	**Quality appraisal: tool/rating (#RCTs)**
	reducing loneliness in older adults.								
Li 2018	To synthesize existing studies and provide an overall picture on the social effects of exergames on older adults.	4	0	Inception - Jan 2017	Age 55+	4	282	Loneliness	Cochrane RoB Tool/Moderate or unclear (2), high (2) RoB
Ma 2020	To review the evidence for the effectiveness of interventions to improve subjective and/or objective social isolation for people with mental health problems.	3	1	Inception - July 2017	People with mental health problems	30	3,080	Subjective and objective social isolation	Cochrane RoB tool/ NA[1,2]
McElfresh 2021	To determine the effectiveness of loneliness interventions among adult cancer survivors	7	0	Inception-May 2019	Cancer survivors aged 18+	7	465	Loneliness	Downs and Black Tool/Very high quality (4), high (2), low (1).
Osborn 2021	To assess the acceptability and effectiveness of interventions to reduce and prevent loneliness and social isolation in young people.	6	0	NR	Populations that include persons aged 10-25.	5	411	Loneliness	Mixed Method Appraisal Tool/ NA[1,2]
Poscia 2018	To summarize knowledge on the effectiveness of interventions for alleviating loneliness and social isolation among older persons.	5	0	2011-Feb 2016	Age 65+	2	94	Loneliness, social isolation	The Effective Public Health Practice Project Tool/ Low quality

		Search and eligibility criteria				Characteristics of included RCTs			
Study	**Objective**	**No. data-bases searched**	**Grey literature 1=yes**	**Years searched**	**Population (e.g., age)**	**No. RCTs**	**No. parti-cipants**	**Outcome**	**Quality appraisal: tool/rating (#RCTs)**
Quan 2020	To review and compare evidence from the past 10 years on the effect of loneliness interventions for older adults living in long-term care facilities.	3	0	2009 - Jan 2019	Adults aged 65+ living in LTC facilities	5	NR	Loneliness, social isolation	The Quality Assessment of Controlled Intervention Studies/Low risk of bias
Shah 2021	To assess the effectiveness of digital technology interventions in reducing loneliness in older adults.	5	0	2010-July 2019	Age 18+	5	459	Loneliness	Cochrane RoB Tool/High quality (5). GRADE by month of FU: 3m = moderate, 4m = very low, 6m = moderate.
Shvedko 2018	To examine the physical activity intervention effects on loneliness, social isolation and low social support in community-dwelling older adults.	5	1	1946-2017	1. Community-dwelling, healthy/ cognitively intact, older adults aged 60+	7	NR	Loneliness, social isolation, social network	Cochrane Review Book Group RoB tool/Score 4 to 8 (range 0-12) for the 7 RCTs
Siette 2017	To evaluate the evidence for the effectiveness of befriending across a range of health conditions and clinical and social outcomes.	9	1	Inception-2017	All populations	5	1,033	Loneliness	Cochrane RoB Tool/ Low (1), moderate (1), high (3) quality
Teoh 2021	To determine the effectiveness and safety of mindfulness-based interventions in alleviating loneliness.	5	0	Inception-May 2020	All populations	8	815	Loneliness	Cochrane RoB tool v2/High RoB (7), some concerns (1) GRADE: Low
Tong 2021	To summarize knowledge on the effectiveness of interventions for	10	0	1978-2021	Adults aged 50+ with no mental illness or cognitive impairment.	24	4,078	Loneliness and social isolation	Cochrane RoB tool/Low (7), moderate (17) RoB

		Search and eligibility criteria				Characteristics of included RCTs			
Study	**Objective**	**No. data-bases searched**	**Grey literature 1=yes**	**Years searched**	**Population (e.g., age)**	**No. RCTs**	**No. parti-cipants**	**Outcome**	**Quality appraisal: tool/rating (#RCTs)**
	alleviating social isolation of older adults.								
Williams 2021	To identify and assess the effectiveness of interventions to reduce social isolation and loneliness that are compatible with COVID-19 shielding and social distancing measures.	6	1	Inception-April 2020	Non-hospitalized persons of any age.	45	NR	Loneliness, social isolation	Downs and Black Tool/ NA[1,4]
Wiwatkunu-pakarn 2021	To examine the relationship between social network site usage and social isolation, loneliness, and depression among older adults.	3	0	Inception-2020	Age 60+	4	551	Loneliness; Social isolation	Cochrane RoB Tool/ NA[1]
Zagic 2021	To determine the effect of interventions designed to promote 'objective social contact' and the 'quality of social connections'.	4	0	1980-2020	Age 18+	58	8,780	Objective social contact, perceived quality of social connection (incl. loneliness)	Cochrane RoB Tool v2/Low RoB (7), some concern (45), high RoB (6) [3]

Notes: Abbrevations: RoB = Risk of bias.

[1] Detailed (but no overall) ratings provided in the paper.:

[2] SR with different types of interventions, but quality only reported overall.

[3] Reported per type of intervention (# Low-Some concern-High). Social access (3-11-1), Support (1-11-3), Social skills (0-2-0), psychological (4-8-0)

[4] Reported per type of intervention (# Poor-Fair-Good). Social facilitation (3-2-5), Support (1-2-0), psychological (0-5-5), psychoeducation (0-3-1), Animal-assisted (1-2-0), Health/social care (0-1-1), Leisure/skill development (14-2-1)

[5] GRADE = Moderate in alle subgroup analyses by type of intervention.

[6] Reported per type of intervention (# Poor-Fair-Good): Support (0-4-0), social skills (2-0-3), social and emotional skills (5-1-1), psychological (2-3-3), learning hobby (2-0-0)
[7] Psychological (all: High (score 9 of 9)), animal-assisted (Score 7/8 out of 9)

Table 2a. Characteristics of reviews on **multicomponent** (≥2 types) interventions

Author year Outcome Population details	Intervention details		Findings Effect sizes (95% CI) Subgroup analysis	Overall conclusion, in color (see explanation below)	
	Intervention vs. comparator (#studies)	Delivery (group vs. ind.) Mode (F2F, internet) Frequency/duration (F/D) Follow-up (FU)		SI	Lone
Review with meta-analysis					
Christensen 2021 Loneliness Diverse [1]	Social support (19), social network (16), social and emotional skills training (26), psychological treatment (17), psychoeducation (6) vs No intervention (details not provided)	Details provided separate by type of intervention, see tables below.	Short-term effect (≤4 weeks): SMD -0.47 (-0.33; -0.61), p< 0.001. I^2 = 83%, 54 studies. Long-term (5-26 weeks) effect: SMD -0.49 (-0.23, -0.76), p< 0.001. I^2 = 85%, 18 studies (n=1,826) Based on short-term effects: **- age** 6-25 (SMD -0.30 (-0,47; -0.13), 14 studies), age 26-64 (SMD -0.29 (-0.48; -0.10), 12 studies), and age 65+ (SMD -0.60 (-0.88; -0.33), 28 studies). - **group based** (SMD -0.53 (-0.72; -0.34), 37 studies) vs. individual (SMD -0.31 (-0.49; -0.15), 16 studies). - digital (SMD -0.38 (-0.61; -0.19), 14 studies) vs. non-digital (SMD -0.49 (-0.67; -0.32), 40 studies). **- study quality**: high (SMD -0.43 (-0.79; -0.08), 9 studies, I^2 =81%), moderate (SMD -0.53 (-0.75; -0.30), 32 studies, I^2 =87%), low (SMD -0.40 (-0.56; -0.23), 13 studies, I^2 =59%).		
Eccles 2021 Loneliness Young people (≤ age 25)	Social support (4), social skills (5), social and emotional skills (7), psychological (8), learning new skills (2) vs No intervention (details not provided)	Details provided separate by type of intervention, see tables below.	Hedges' g = 0.32 (0.19; 0.44), p<.001. I^2= 67%. - **intervention type**: social skills training g = 0.44 (0.10; 0.79), p = .01; social and emotional skills g = 0.27 (0.01; 0.53), p = .04; enhanced social support g = 0.21 (0.16; 0.59), p = .27; psychological intervention g = 0.36 (0.12; 0.60), p < .01; learning a hobby/skill g = 0.47 (0.05; 0.99), p = .08. - **study quality**: poor g = 0.42 (0.22; 0.63), p< .00, 11 studies; fair g = 0.26 (0.06; 0.45), p = .01, 7 studies; good g = 0.26 (0.04; 0.48), p = .02, 7 studies.		
Fu 2022 Loneliness Diverse [1]	Social network (6), social support (3), social skills (1), social cognition (3)	Details provided separate by type of intervention, see tables below.	SMD -0.41 (-0.70; -0.13), p < .00, I^2 = 79%. - **individually delivered** interventions SMD -0.39 (-0.71; -0.07), p < .05, I^2 >50%, 6 studies vs. intervention delivered in group (5		

	vs TAU (5), brief contact (2), no treatment (4), social activity (2).		studies) and mixed format (2 studies) both p > .05 (ES not reported). - **time of follow-up**: evidence of effect found <3 months SMD -0.33 (-0.52; -0.14), p < .01, I^2< 50%; at 3-6 months SMD -0.32 (-0.57; -0.07), p < .01, I^2> 50%; but not at >6 months SMD 0.37 (-0.02; 0.76), p > .05, I^2 NR.		
McElfresh 2021 Loneliness Cancer survivors	Social support (4), social access (1), social cognitive training (1), social skills training (1) vs. NR	Delivery: Groups (3), one-to-one phone-based (3), one-to-one internet-based (1) Mode: Mostly F2F F/D: NR/6-13m FU: NR	Hedge's g = –0.32 (–0.50; –0.14), p<.001, I^2 = 17%.		
Zagic 2021 Social isolation, loneliness Diverse [1]	Social support (4), social access (1), social cognitive training (1), social skills training (1) vs NR	Details provided separate by type of intervention, see tables below.	Social isolation: significant only after removing one outlier: g = 0.43 (0.21, 0.65), I^2 = 46%, 10 studies. Social access interventions g = 0.67 (0.36; 0.98), I^2 = 17%, 4 studies; social support interventions g = 0.29 (-0.09; 0.67, I^2 = 49%, 4 studies. Other interventions NR due to few studies. Loneliness: g = −0.33 (-0.51; −0.16), I^2 =77%, 32 studies. Psychological interventions g = − 0.53 (−0.79; −0.26), I^2 = 71%, 12 studies); social access g = − 0.13 (−0.41; 0.17), I^2 =60%, 8 studies; social support interventions g = − 0.24 (−0.61; 0.14), I^2 =87%, 10 studies. Social skills NR due to few studies.		
Reviews with narrative synthesis					
Ma 2020 Social isolation, loneliness Mental health problems	Supported socialization (SI:1, L:2), social skills and psychoeducation (SI: 4, L:2), psychological (L:4), other (SI:7, L:5) vs TAU, no/other treatment	Delivery: NR Mode: NR F/D: NR FU: NR	Social isolation: 3/8 trials showed an effect. 5/8 showed evidence of no effect. Loneliness: No evidence of effect in any of the 6 trials.		
Poscia 2018 Loneliness Older adults (65+)	Social support (1), animal therapy (1). vs. no treatment, other activity	Delivery: NR Mode: F2F F/D: NR FU: 6m, 12m	When social support or animal therapy were compared to no treatment or other activity there were significant effects in both RCTs in favor of the intervention.		
Tong 2021 Social isolation, loneliness Older adults (50+)	Group interventions (8), individual interventions (6), mixed (4). Content details NR. vs. no intervention, conventional therapy, telephone calls, waiting list, local community service, other	Delivery: Mix Mode: Face to face + remote F/D: Weekly, over 6-12m FU: NR	9 out of 19 trials on loneliness showed significant effects. 12 out of 19 trials on social isolation showed significant effects.		

Notes: [1] Not limited to a specific group. “Effect” indicates a (beneficial) significant ($p < .05$) effect in favor of the intervention. Abbrevations: F2F = Face-to-face, FU = follow-up, F/D = frequency/duration, TAU = treatment as usual. W = weeks, Y = years. ES = Effect size. N = number of participants. g = Hedges’ g. SMS = standardized mean difference.

Table 2b. Characteristics of the reviews on **social network/contact** interventions

Author year Outcome Population details	Intervention details		Findings Effect sizes (95% CI)	Overall conclusion, in color	
	Intervention vs. comparator (#studies)	Delivery (group vs. ind.) Mode (F2F, internet) Frequency/duration (F/D) Follow-up (FU)			
Review with meta-analysis				SI	Lone
Christensen 2021 Loneliness Diverse populations	Social network (e.g., senior meetings, physical activity groups, choir, arts) vs. NR	Delivery: Mix Mode: NR F/D: NR FU: NR	SMD -0.30 (-0.50; -0.09), p< .01, I^2> 65%, 15 studies (n= NR).		
Fu 2022 Loneliness Diverse populations	Social contact - remotely delivered (e.g., phone, video-call, internet contact) vs. No treatment (4), TAU (1), social activity (1)	Delivery: About 50-50 Mode: phone, digital F/D: NR/2-30 weeks Follow-up: NR	SMD -0.13 (-0.55; 0.29), p= .54, I^2= 76%, 6 studies (n= 411).		
Zagic 2021 Social isolation, loneliness Diverse populations	Social access (details NR) vs. TAU, other activity	Delivery: NR Mode (F2F, internet): NR F/D: Weekly, over 26-52 weeks FU: NR	Social isolation: Hedges' g = 0.67 (0.36; 0.98), p< .05, I^2 = 17%, 4 studies (n = NR). Loneliness: Hedges' g −0.13 (−0.41; 0.17), p> .05, I^2 = 60%, 8 studies (n= NR).		
Reviews with narrative synthesis					
Barnett 2020 Social isolation, loneliness Mental health problems	Supported socialization (e.g., watching films with others, social network intervention, activities with volunteer, self-help training course) vs. TAU	Delivery: NR Mode (F2F, internet): NR F/D: NR FU: NR	Social isolation: 3/4 trials showed significant (p< .05) beneficial effects at posttest. Loneliness: 1/8 trials showed significant (p< .05) beneficial effects at posttest (ES and n's= NR)		
Ma 2020 Loneliness, social isolation Mental health problems	Supported socialization (details NR) vs TAU, no treatment, other treatment	Delivery (group vs. ind.): NR Mode: NR F/D: NR/12 weeks-2y FU: 2y (1)	SI: 2/2 trials showed effect. One trial found that the positive effect was significant after 2 years.		

			L: 1 out of 3 trials showed significant (p< .05) positive result. 2 out of 3 showed evidence of no effect.		
Williams 2021 Loneliness, social isolation Population: NR	Social facilitation - compatible with COVID-19 social distancing measures (e.g., computer/internet training, videoconferencing, group meetings, peer networking). vs. TAU, other activity	Delivery: NR Mode: digital F/D: Weekly, over 6-12m FU: NR	SI: 1 poor quality RCT showed significant intervention effect, 2 good quality RCTs showed non-significant effect. L: 4 RCTs (1 fair, 3 good quality) showed significant positive effects. Two of these were videoconferencing for nursing home residents. 2 poor-quality RCTs showed non-significant effects.		
Wiwatkunupakarn 2021 Loneliness Older adults 60+	Social network site usage (e.g., internet training, social network site use) vs. TAU	Delivery: NR Mode: Internet F/D: NR FU: NR	Only one of 4 RCTs found significant (beneficial) effects. In three trials, there was evidence of no effect. effect sizese not reported. 551 participants.		

	Evidence of (beneficial) effect
	Evidence uncertain
	Evidence of no effect
	No RCTs for this outcome/type of intervention

Table 2c. Characteristics of the reviews on **social support** interventions

Author year Outcome Population details	Intervention details		Findings Effect sizes (95% CI)	Overall conclusion, in color	
	Intervention vs. comparator (#studies)	Delivery (group vs. ind.) Mode (F2F, internet) Frequency/duration (F/D) Follow-up (FU)			
Review with meta-analysis				Soc.is	Lone
Christensen 2021 Loneliness NR	Enhancing social support (e.g., home visiting schemes, befriending services and mentorship programmes) Vs TAU	Delivery): Mix Mode: NR F/D: NR FU: NR	SMD -0.39 (-0.56; -0.23), p< .01, I^2>65%, 22 studies (n= NR)		
Eccles 2021 Loneliness Age 13-19 (all), students (2), ASD (1)	Enhancing social support (examples NR) Vs. NR	Delivery): Mix Mode: F2F F/D: NR/3-7m FU: NR	Hedges' g = 0.21 (-0.16; 0.59), p = .27, 4 studies (n=1,294). Heterogeneity NR. 2 out of 3 RCTs found non-significant (p> .05) effects.		
Fu 2022 Loneliness Older adults (isolated elderly 2, caregivers 1)	Social support - remotely delivered (via telephone). Vs Usual care, brief contact, no treatment	Delivery): Group (n=2) and ind (n=1) Mode: telephone F/D: 1-5 times per w/4-8 weeks FU: 24 weeks (2), no (1)	SMD -0.47 (-0.77; -0.18), p < .01, I^2 = 42%, 3 studies (n=388)		
Siette 2017 Loneliness Caregiver, isolated elderly (2), severe physical or mental health problems (2)	Befriending (one-to-one companionship provided regularly by a volunteer) Vs TAU, no treatment	Delivery): Individual Mode: F2F, telephone F/D: 1-2 per week/6w to 12m FU: 2-9m (3)	SMD -0.03 (-0.18; 0.12), p> .05, I^2 = 0%. None of the 5 trials show short-term or long-term significant effects on loneliness. Loneliness was not primary outcome in any of the trials.		
Zagic 2021 Social isolation, loneliness	Social support (regular contact, care, or companionship). Vs TAU, other activity	Delivery): NR Mode: NR F/D: Weekly/6-12m FU: NR	Objective social contact: Hedges' g = 0.29 (-0.09; 0.67), I^2 = 49%, 4 studies.		

NR			Perceived social isolation: Hedges' g = −0.24 (−0.61; 0.14), I^2 = 87%, 10 studies.		
Reviews with narrative synthesis					
Williams 2021 Social isolation, loneliness NR	Befriending compatible with COVID-19 physical distancing measures (telephone calls/home visits) Vs NR	Delivery: NR Mode: digital F/D: NR FU: NR	SI: 1 RCT shows non-significant effect. L: 1 RCT show significant effect, 1 RCT show non-significant effect.		

Table 2d. Characteristics of the reviews on **social skills** interventions

Author year Outcome Population details	Intervention details		Findings Effect sizes (95% CI)	Overall conclusion, in color	
	Intervention vs. comparator (#studies)	Delivery (group vs. ind.) Mode (F2F, internet) Frequency/duration (F/D) Follow-up (FU)			
Review with meta-analysis				Soc. Is.	Lone.
Christensen 2021 Loneliness Diverse	Social and emotional skills training (e.g., role-play, conversation-based training). Vs NR	Delivery: Mix Mode: NR F/D: NR FU: NR	SMD -0,38 (-0.62; -0.15), p< .01, I^2 >65%, 21 studies (n = NR).		
Eccles 2021 Loneliness At-risk clinical (social phobia 2, cystic fibrosis 1, ASD 2).	Social skills training (examples NR) Vs. NR	Delivery: Group Mode: F2F F/D: 1-2 sessions per w/12-14 w FU: 6-9 months (n=2) Outcome:	g = 0.44 (0.10; 0.79; p = .013), 5 studies (n = NR). 3 out of 5 RCTs found non-significant (p> .05) effects. Heterogeneity: NR		
Eccles 2021 Loneliness Age 3-15 (general 2, at-risk 5: developmental disorder, problem behavior)	Social and emotional skills (examples NR) Vs. NR	Delivery: Group (4), Ind (3) Mode: Tech (3), Non-tech (4) F/D: Weekly/6-12m FU: 3-6 m (3)	g = 0.27 (-0.01; 0.53), p = .04, 7 studies. Heterogeneity: NR 4/7 RCTs found non-significant (p> .05) effects.		
Reviews with narrative synthesis					
Barnett 2020 Social isolation Mental health problems	Supported socialization (examples NR) Vs Skill training, other therapy	Delivery: NR Mode: NR F/D: NR FU: NR	All 3 trials show positive intervention effects.		
Ma 2020 Social isolation, loneliness Mental health problems	Social skills training and/or psychoeducation (examples NR) Vs TAU, no/other treatment	Delivery: NR Mode: NR F/D: NR FU: NR	Social isolation: Significant effects in one 1/2 trials. Loneliness: Significant effects in 1/4 trials. (n's NR)		
Osborn 2021	Social skills and function (PEERS program)	F Delivery: Group Mode: F2F	Significant intervention effects (p< .05), 2 studies, 56 participants		

Loneliness Age 13-23 and ASD	Vs NR	F/D: Weekly/8w. FU: NR			
Zagic 2021 Loneliness Mean age 20 (1), 63 (1)	Social skills training (interpersonal communication skills) Vs. NR	Delivery: Group Mode: F2F F/D: Weekly/6-8w. FU: NR	One trial with a beneficial effect (Hedges' g = -1.04 (-2.01; -0.07), n=17) with young people with ASD. One trial on older women with no effect (n=142)		

Table 2e. Characteristics of the reviews on **psychological** interventions

Author year Outcome Population details	Intervention details		Findings Effect sizes (95% CI)	Overall conclusion, in color	
	Intervention vs. comparator (#studies)	Delivery (group vs. ind.) Mode (F2F, internet) Frequency/duration (F/D) Follow-up (FU)		Soc. is.	Lone.
Review with meta-analysis					
Abbott 2019 Loneliness Older adults in LTC	Robopets (spending time with robotic animal). Vs. No intervention, normal dog	Delivery: Group, Ind. Mode: F2F F/D: Weekly or biweekly/8-12 w. FU: No	SMD −0.51 (−1.24; 0.22), p= .02, I^2 = 46%, 2 studies (n = 59). 1 of 2 RCTs reached significance (p< .05).		
Christensen 2021 Loneliness Diverse	Psychological (examples NR) Vs NR	Delivery: Mix Mode: NR F/D: NR FU: NR	SMD −0.50 (−0.74; −0.26), I^2 >65%, 16 studies (n = NR).		
Eccles 2021 Loneliness Age 10-25. 5/8 studies: at-risk (war-affected, depressive symptoms, lonely, incarcerated, substance abuse)	Psychological (examples NR) Vs. NR	Delivery: Group (7), ind (1) Mode: Non-tech. F/D: Mostly weekly/5-12 w. FU: 3-6 m (4)	g = 0.36 (0.12; –0.60), p = .003, 8 studies (n = NR). Heterogeneity: NR 4/8 RCTs found non-significant (p> .05) effects.		
Fu 2022 Loneliness LTC (2), isolated (1).	Addressing maladaptive social cognition, remotely delivered (examples NR) ¨ Vs. TAU (1), other activity (1)	Delivery: Group (2), ind (1) Mode: Internet, telephone, video call F/D: NR/4-7 weeks FU: NR	SMD −1.04 (−1.98; −0.10), p=.03, I^2=87%, 3 studies (n = 178).		
Hickin 2021 Loneliness	Psychological (CBT 9, mindfulness 3, integrative 6, interpersonal therapy 1, reminiscence therapy 1, social skills training 3, social identity 1, gratitude 1)	Delivery: Group 16, ind 8, mix 7 Mode: F2F (24), phone or internet (7) F/D: Mostly weekly/1-52w (mean 10w) FU: NR	SMD 0.43 (0.18; 0.68), p< .05, I^2 =90%, 31 studies (n = 3959). Moderation analysis of effect of different types of interventions: p= .06. Reminiscence, social identity, and CBT had the highest effect size.		

Age 8-81 (M = 45). Children (4), Age 18-25, Age 65–74 (10), 75+ (4).	vs Waitlist (14), active (11), no treatment (6).				
Teoh 2021 Loneliness Students (2) and adults (6); with (3) or without (3) mental health problems; lonely (1). No. participants/studies: 815/8	Mindfulness (mindfulness stress-reduction/CBT, cognitively based compassion training, meditation, yoga) Vs Wait list, other activity (e.g. health education class, guidance in free reflection (not mindfulness), aerobic, no treatment	Delivery: Group Mode: F2F (7), phone (1) F/D: Typically weekly/8w-2y FU: NR	4/8 trials showed significant intervention effect. Pooled analysis results: - combining three trials (mentally health participants, control = waitlist) showed significant improvement (UCLA-R scale): MD = −6.33 (−9.39; −3.26), I^2 = 0%; GRADE low). - mentally unhealthy participants: no significant improvement (varied scales): SMD = −0.23 (−0.80; 0.33), I^2 = 63%; GRADE very low). - stronger effects among young populations (age 17-30, n=2, SMD = -0.85 (-1.36; -0.35), I^2=0; GRADE low) than older samples (n=5, SMD = -0.12 (-0.43; 0.19), I^2 = 18%, GRADE low).		
Zagic 2021 Loneliness NR	Psychological (e.g., psychotherapy, CBT, mindfulness) Vs. NR	Delivery: About equal mix group/ind. Mode: About equal mix tech/nontech F/D: From daily to weekly/1d-39w FU: NR	Hedges' g = −0.53 (−0.79; −0.26), I^2 = 71%, 12 studies (n = NR).		
Reviews with narrative synthesis					
Barnett 2020 Social isolation, loneliness Mental health problems	Changing cognitions (reframing, social cognition and interaction training, social mentoring, CBT) Vs Waitlist (3), other activity (3), no intervention (1), unknown (1)	Delivery: Group (7), smartphone (1) Mode: F2F (7), phone (1) F/D: 1-2 session per w/8w (7), 2y (1) FU: NR .	Social isolation: Non-significant effects in all 4 trials. Loneliness: Of the 2 trials, only one found a significant (beneficial) intervention effect.		
Gardiner 2018 Loneliness Older adults aged 55+, home-dwelling	Psychological therapies (mindfulness, stress-reduction, rehabilitation, support, cognitions) Vs. NR	Delivery: Group Mode: F2F F/D: 0,5-1 session per w/8-12w FU: NR	2 of 3 psychological interventions showed significant effect on loneliness post-intervention. 330 participants.		
Gardiner 2018 Loneliness Older adults in LTC	Animal assisted therapy (visit from living/robotic dog) Vs. TAU	Delivery: Group Mode: F2F F/D: Weekly/6-8w FU: NR	Significant interventions effects at posttest (n = 75). (i) Significant reduction in loneliness for both ABIO and animal intervention, with no difference between living and robotic. (ii) Significant effect on of animal assisted therapy.		

Ma 2020 Social isolation, loneliness Mental health problems	Changing cognitions (examples NR) vs TAU, no/other treatment	Delivery: NR Mode: NR F/D: NR FU: NR	Social isolation: Effect in 1/2 trials. Loneliness: Effects in 2/6 trials. (n's = NR)		
Osborn 2021 Loneliness Young people (age 14-25) "at risk of loneliness"	Psychological (CBT and positive psychology-oriented interventions to address cognitions, self-compassion, and competence. Vs NR	Delivery: Individual Mode: Internet (1), smartphone (1) F/D: NR FU: NR	Effects found for 2 of 3 RCTs (n = 361).		
Quan 2020 Loneliness Older adults living in LTC	Therapy (reminiscence 2, pet 2) Vs TAU, other activity, waitlist	Delivery: Individual Mode: F2F F/D: 1-2 sessions weekly/8-12w FU: NR	All 4 RCTs with significant positive effect on loneliness. Loneliness reduced significantly in intervention group compared to control (n = NR).		
Williams 2021 Social isolation, loneliness NR	Psychological therapy compatible with COVID-19 social distancing (e.g., mindfulness, CBT, other therapy) Vs. NR	Delivery: NR Mode: NR F/D: NR FU: NR	Social isolation: Effect found for 1 fair-quality logotherapy and 1 good-quality Tai Chi trial. Loneliness: 4/7 show effect. Effects found for 2 good-quality mindfulness, 2 fair-quality (reminiscence and CBT), and 1 good-quality Tai Chi trial. No effect: 1 fair-quality reminiscence therapy, 2 fair/good quality CBT.		

Table 2f. Characteristics of the reviews on **psychoeducation** interventions

Author year Outcome Population details	Intervention details		Findings Effect sizes (95% CI)	Overall conclusion, in color	
	Intervention vs. comparator (#studies)	Delivery (group vs. ind.) Mode (F2F, internet) Frequency/duration (F/D) Follow-up (FU)			
Review with meta-analysis				Soc.is	Lone
Christensen 2021 Loneliness NR	Psychoeducation (examples NR) Vs. NR	Delivery: Mix Mode: NR F/D: NR FU: NR	SMD = -1.12 (-2.61; 0.36), I^2 > 65%, 4 studies		
Reviews with narrative synthesis					
Barnett 2020 Loneliness Mental health problems	Psychoeducation (e.g., education, guided peer support, social identity) Vs. TAU	Delivery: NR Mode: F2F F/D: NR FU: NR	Only 1 of the 4 trials showed significant beneficial intervention effects. 434 participants.		
Ma 2020 Social isolation, loneliness Mental health problems	Social skills training and/or psychoeducation (examples NR) Vs TAU, no/other treatment	Delivery: NR Mode: NR F/D: NR FU: NR	Social isolation: Significant effects in one 1/2 trials. Loneliness: Significant effects in 1/4 trials. (n's NR)		
Williams 2021 Loneliness NR	Educational programme compatible with COVID-19 social distancing (topics relevant to social isolation/loneliness or health/well-being). Vs. NR	Delivery: NR Mode: NR F/D: NR FU: NR	Effect found for 2 fair-quality RCTs on friendship/social integration education. No effect: 2 fair/good quality RCTs. (n's = NR).		

Table 2g. Characteristics of the reviews on **digital** interventions

Author year Outcome Population details	Intervention details		Findings Effect sizes (95% CI)	Overall conclusion, in color	
	Intervention vs. comparator (#studies)	Delivery (group vs. ind.) Mode (F2F, internet) Frequency/duration (F/D) Follow-up (FU)			
Review with meta-analysis				Soc.is	Lone
Jin 2021 Loneliness Older adults (60+)	Technology-based (digital smartphone-based videoconferencing to interact with family members (3), computer training/internet use (2), teleconferences (1). Vs. Regular care, regular family visits, alternative activities	Delivery: NR Mode: Internet F/D: Weekly or biweekly for 1-6m FU: NR	SMD −0.08 (-0.33; 0.17), p = 0.53, I^2 = 35%, 6 studies (n = 391). Subgroup analysis (I^2 NR): - smartphone-based video calls SMD −0.01 (−0.25; 0.24), p = 0.95, 3 studies - computer-based training SMD −0.38 (−0.19; 0.64), p = 0.47, 3 studies		
Shah 2021 Loneliness Older adults (mean age 73-78 years), independent or assisted living	Social internet-based activities (via social websites, videoconferencing, customized computer platforms, WhatsApp groups, etc.) Vs TAU, no activity	Delivery: Group Mode: Digital F/D: NR/3-12m FU: 3m (2), 4m (2), 6m (2), 12m (1)	Separate MA for time of FU 3 months: SMD 0.02 (−0.36; 0.40), p= .92, I^2 = 0%, 3 studies 4 months: SMD −1.11 (-2.60; 0.38), p= .14, I2 = 88%, 2 studies. 6 months: SMD −0.11 (−0.54; 0.32), p= .61, I2=37%, 2 studies.		
Reviews with narrative synthesis					
Heins 2021 Social isolation, loneliness Older adults (age 55+) with or without dementia	Technologically-assisted (mobile app/web-based therapy, self-monitoring of physical activity, psychoeducation, health education) Vs. Waitlist, no intervention, TAU	Delivery: Mix Mode: Internet F/D: NR/3-6m FU: 12w (1)	Social isolation: Effect found in one trial (non-significant after 12 weeks). No effect in one other trial. 2 studies (n=110). Loneliness: No effect found in one study (n = 60).		
Li 2018 . Loneliness Older adults (mean age >75)	Exergames – combining digital gaming (e.g, WII) and physical exercise Vs. other activities (board games, watching TV, normal exercise)	Delivery: Individual Mode: Internet F/D: 1-3 sessions weekly/4-12w FU: No	All 4 RCTs find beneficial intervention effects (p<.05). 4 studies (n = 282).		

Table 2h. Characteristics of the reviews on **mix/other** interventions

Author year Outcome Population details	Intervention details		Findings Effect sizes (95% CI)	Overall conclusion, in color	
	Intervention vs. comparator (#studies)	Delivery (group vs. ind.) Mode (F2F, internet) Frequency/duration (F/D) Follow-up (FU)			
Review with meta-analysis				Soc.is	Lone
Eccles 2021 Loneliness Adolescents (age 11-16) at-risk (orphan, learning disorder)	Learning new hobby (examples NR) Vs. NR	Delivery: Group Mode: F2F F/D: 4 times/w for 3m, weekly for 25w FU: No	g = 0.47 (-0.05; 0.99), p = .08, 2 studies (n = 118).		
Svedko 2018 Social network, social isolation, loneliness Community-dwelling older adults (age 51-82).	Physical activity with social interactions (e.g., health education, CBT, lectures, nurse counselling). Vs. NR	Delivery: Mostly groups Mode: NR F/D: The duration was 12 weeks. No other details. FU: 6-12m	MA for social network: SMD −0.00 (−0.28; 0.27), p = .99, I^2 = 68%, 4 studies. Narrative synthesis showed that no effect was found for loneliness (n=3) or social isolation (n=1). (n's = NR)		
Reviews with narrative synthesis					
Choi 2021 Loneliness Older adults (60+)	ICT interventions: Robot animal (1), online interventions (support, information, maladaptive cognitions) (2) Vs. TAU	Delivery: Individual Mode: F2F F/D: NR/6-15w FU: NR	Robot animal: no effect. Two online support interventions showed beneficial effects, one of which showed effect maintained after 12 months. 3 studies (n = NR).		
Forsman 2018 Loneliness Older adults	Technology-based (ICT training, computer gaming, Nintendo Wii) Vs. TAU, living dog	Delivery: Individual Mode: Internet F/D: NR FU: 3-98m (2)	No effects found, except in one small study (n=16 in intervention group) of computer gaming (Nintendo). 6 studies (n = 752)		
Williams 2021 Loneliness NR	Animal intervention compatible with COVID-19 social distancing (real or artificial animals: animal-assisted therapy, companionship) Vs. NR	Delivery: NR Mode: NR F/D: NR FU: NR	Beneficial effects: 2 poor/fair quality RCTs (weekly visit by real/robotic seal or dog). No effect: 1 fair quality RCT. 3 studies (n = 118).		

Williams 2021 Loneliness NR	Health and social care provision compatible with COVID-19 social distancing (support from health or social care professionals). Vs NR	Delivery: NR Mode: NR F/D: NR FU: NR	Two trials (n = NR): No effect.		
Williams 2021 Social isolation (6), loneliness (11) NR	Leisure/skill development compatible with COVID-19 social distancing: Provide leisure activities or promote learning a new skill (exercise, computer training, video gaming, gardening, general activities). Vs. NR	Delivery: NR Mode: NR F/D: NR FU: NR	*Social isolation (2/6 significant):* Effect found for 2 poor/fair quality trials (gardening, general activities). No effect for 1 good and 2 fair quality "exercise", 1 fair quality "computer training" intervention. *Loneliness (3/11 significant):* Effects: 2 fair quality "video gaming", 1 fair quality "gardening" RCT. No effect: 1 good and 3 fair quality "exercise", 3 fair quality "computer training", 1 fair quality "general activity" intervention.		

Table 3. Number of RCTs (n) overlapped among reviews

	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**
1.Abbott 2019 (n=2)		0	1	2	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0	1
2.Barnett 2020 (n=23)	0		0	2	0	0	0	0	0	2	0	0	7	0	0	0	0	0	0	0	0	0	1	0	1
3.Choi 2021 (n=3)	1	0		2	0	0	1	1	0	1	0	0	0	0	0	0	0	2	0	0	0	0	1	0	1
4.Christians. 2021 (n=54)	2	2	2		2	0	2	3	0	13	2	0	1	1	1	1	2	2	2	0	3	4	14	1	17
5.Eccles 2021 (n=25)	0	0	0	2		0	0	0	0	4	0	0	1	0	2	0	0	0	0	0	0	0	0	0	1
6.Forsman 2018 (n=6)	0	0	0	0	0		3	0	0	0	2	1	0	0	0	0	0	0	0	1	0	3	5	1	1
7.Fu 2022 (n=13)	0	0	1	2	0	3		0	0	4	3	0	0	1	0	0	0	1	0	1	0	4	3	1	3
8.Gardiner 2018 (n=6)	1	0	1	3	0	0	0		0	1	0	0	0	0	0	1	0	0	1	0	1	2	3	0	1
9.Heins 2021 (n=3)	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.Hickin 2021 (n=31)	0	2	1	13	4	0	4	1	0		0	0	0	2	4	0	1	1	0	0	3	2	5	0	13
11.Jin 2021 (n=6)	0	0	0	2	0	2	3	0	0	0		0	0	0	0	1	0	0	0	0	0	1	2	1	1
12.Li 2018 (n=4)	0	0	0	0	0	1	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	2	0	0
13.Ma 2020 (n=30)	0	7	0	1	1	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	1	1	0	0
14.McElfresh 2021 (n=7)	0	0	0	1	0	0	1	0	0	2	0	0	0		0	0	0	0	0	0	1	0	0	0	2
15.Osborn 2021 (n=5)	0	0	0	1	2	0	0	0	0	4	0	0	0	0		0	0	0	0	0	1	0	1	0	2
16.Poscia 2018 (n=2)	1	0	0	1	0	0	0	1	0	0	1	0	0	0	0		1	0	0	0	0	1	2	0	1
17.Quan 2020 (n=5)	1	0	0	2	0	0	0	0	0	1	0	0	0	0	0	1		0	0	0	0	0	2	0	2
18.Shah 2021 (n=5)	0	0	2	2	0	0	1	0	0	1	0	0	0	0	0	0	0		0	0	0	0	1	1	1
19.Shvedko 2018 (n=7)	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0		0	0	2	4	0	1
20.Siette 2017 (n=5)	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0		0	1	1	0	0
21.Teoh 2021 (n=8)	0	0	0	3	0	0	0	1	0	3	0	0	0	1	1	0	0	0	0	0		0	2	0	3
22.Tong 2021 (n=24)	0	0	0	4	0	3	4	2	0	2	1	0	1	0	0	1	0	0	2	1	0		8	1	3
23.Williams 2021 (n=45)	2	1	2	14	0	5	3	3	0	5	2	2	1	0	1	2	2	1	4	1	2	8		2	13
24.Wiwat. 2021 (n=4)	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	2		1
25.Zagic 2021 (n=58)	1	1	1	17	1	1	3	1	0	13	1	0	0	2	2	1	2	1	1	0	3	3	13	1	

Table 4. Citations matrix with systematic reviews (coloums) and unique primary studies (rows). Check marks (√) indicate when a primary study is included in a review.

	1.Abbott 2019 (n=2)	2.Barnett 2020 (n=23)	3.Choi 2021 (n=3)	4.Christians. 2021 (n=54)	5.Eccles 2021 (n=25)	6.Forsman 2018 (n=6)	7.Fu 2022 (n=13)	8.Gardiner 2018 (n=6)	9.Heins 2021 (n=3)	10.Hickin 2021 (n=31)	11.Jin 2021 (n=6)	12.Li 2018 (n=4)	13.Ma 2020 (n=30)	14.McElfresh 2021 (n=7)	15.Osborn 2021 (n=5)	16.Poscia 2018 (n=2)	17.Quan 2020 (n=5)	18.Shah 2021 (n=5)	19.Shvedko 2018 (n=7)	20.Siette 2017 (n=5)	21.Teoh 2021 (n=8)	22.Tong 2021 (n=24)	23.Williams 2021 (n=45)	24.Wiwat. 2021 (n=4)	25.Zagic 2021 (n=58)	# Times included
Abbott 1985				√																					1
Aberg-Wistedt 1995													√												1
Adams 1988				√																					1
Alaviani 2015				√						√															2
Ammerman 2013													√												2
Andersson 1985				√																			√		2
Aspy 2017																								√	1
Atkinson 1996													√												1
Banks 2002				√																					1
Banks 2005								√																	1
Banks 2008	√		√	√				√															√		5
Bartlett 2019										√															1
Beidel 2000					√																				1
Bickmore 2005																							√		1
Björkman 2002													√												1
Black 2014																						√			1
Boevink 2016		√		√									√												3
Borji 2018																								√	1
Borji 2020				√																					1
Bouwman 2017				√																			√	√	4
Brennan 1991																						√			1
Bruehlman-Senec. 2020										√					√										2

	1.Abbott 2019 (n=2)	2.Barnett 2020 (n=23)	3.Choi 2021 (n=3)	4.Christians. 2021 (n=54)	5.Eccles 2021 (n=25)	6.Forsman 2018 (n=6)	7.Fu 2022 (n=13)	8.Gardiner 2018 (n=6)	9.Heins 2021 (n=3)	10.Hickin 2021 (n=31)	11.Jin 2021 (n=6)	12.Li 2018 (n=4)	13.Ma 2020 (n=30)	14.McElfresh 2021 (n=7)	15.Osborn 2021 (n=5)	16.Poscia 2018 (n=2)	17.Quan 2020 (n=5)	18.Shah 2021 (n=5)	19.Shvedko 2018 (n=7)	20.Siette 2017 (n=5)	21.Teoh 2021 (n=8)	22.Tong 2021 (n=24)	23.Williams 2021 (n=45)	24.Wiwat. 2021 (n=4)	25.Zagic 2021 (n=58)	# Times included
Buckle 2015				√																						1
Bøen 2012													√									√				2
Cacioppo 2015				√						√																2
Caputi 2020										√																1
Castelein 2008		√											√													2
Chan 2017				√															√			√	√		√	5
Charlesworth 2008																				√						1
Chiang 2010				√						√							√						√		√	5
Choi 2020							√			√															√	3
Christian & D'auria 2006					√																					1
Chu 2019				√																						1
Cleary 2015														√												1
Cohen-Mansfield 2018				√						√													√		√	4
Cole 1995													√													1
Coleman 2005														√												1
Conoley 1985		√											√										√			3
Conoley 1998																									√	1
Constantino 1988																						√				1
Craig 2016					√																					1
Craig 2018					√																					1
Cresswell 2012				√				√		√											√		√		√	5
Cross 2018					√																					1
Czaja 2017																						√				1
Czaja 2018			√															√					√			3

	1.Abbott 2019 (n=2)	2.Barnett 2020 (n=23)	3.Choi 2021 (n=3)	4.Christians. 2021 (n=54)	5.Eccles 2021 (n=25)	6.Forsman 2018 (n=6)	7.Fu 2022 (n=13)	8.Gardiner 2018 (n=6)	9.Heins 2021 (n=3)	10.Hickin 2021 (n=31)	11.Jin 2021 (n=6)	12.Li 2018 (n=4)	13.Ma 2020 (n=30)	14.McElfresh 2021 (n=7)	15.Osborn 2021 (n=5)	16.Poscia 2018 (n=2)	17.Quan 2020 (n=5)	18.Shah 2021 (n=5)	19.Shvedko 2018 (n=7)	20.Siette 2017 (n=5)	21.Teoh 2021 (n=8)	22.Tong 2021 (n=24)	23.Williams 2021 (n=45)	24.Wiwat. 2021 (n=4)	25.Zagic 2021 (n=58)	# Times included
Dammeyer 2004				√																						1
Davidson 2004		√																								1
Deckers 2016					√																					1
Deters 2013				√																						1
Diab 2014					√					√																2
Dodds 2015														√							√					2
Dodge 2015																						√				1
Dowd 2014																						√				1
Drenetea 2006																						√				1
Eggert 1995													√													1
Elsherbiny 2018																						√				1
Evcik 2002																			√							1
Fokkema 2007				√																						1
Frankel 2010					√					√																2
Fuki 2003																						√				1
Fukui 1993				√																						1
Fukui 2003										√				√											√	3
Gantman 2012					√					√					√										√	4
Gawrysiak 2009													√													1
Gelkopf 1994		√											√													2
Glynn 2004		√																								1
Graf 2002				√																						1
Granbom 2017																									√	1
Granholm 2005		√																								1

	1.Abbott 2019 (n=2)	2.Barnett 2020 (n=23)	3.Choi 2021 (n=3)	4.Christians. 2021 (n=54)	5.Eccles 2021 (n=25)	6.Forsman 2018 (n=6)	7.Fu 2022 (n=13)	8.Gardiner 2018 (n=6)	9.Heins 2021 (n=3)	10.Hickin 2021 (n=31)	11.Jin 2021 (n=6)	12.Li 2018 (n=4)	13.Ma 2020 (n=30)	14.McElfresh 2021 (n=7)	15.Osborn 2021 (n=5)	16.Poscia 2018 (n=2)	17.Quan 2020 (n=5)	18.Shah 2021 (n=5)	19.Shvedko 2018 (n=7)	20.Siette 2017 (n=5)	21.Teoh 2021 (n=8)	22.Tong 2021 (n=24)	23.Williams 2021 (n=45)	24.Wiwat. 2021 (n=4)	25.Zagic 2021 (n=58)	# Times included
Gustafsson 2017				√																						1
Hall 1992																							√			1
Harris 1978																					√					1
Hartke 2003							√																			1
Haslam 2019		√		√						√																3
Hasson-Ohayon 2007													√													1
Hasson-Ohayon 2014													√													1
Heckman 2006										√																1
Heiney 2012																									√	1
Heller 1991							√															√	√			3
Hind 2014											√					√										2
Hopps 2003				√																						1
Iliffe 2014																							√			1
Interian 2016													√													1
Jarvis 2019			√	√			√			√								√							√	6
Jazaieri 2012																					√					1
Jessen 1996				√																			√		√	3
Jing 2018							√			√																2
Jung 2009												√											√			2
Kahlbaugh 2011						√						√											√			2
Kahlon 2021							√																			1
Kamegaya 2014																			√				√			2
Kaplan 2011													√													1
Kjøbli 2014					√																					1

	1.Abbott 2019 (n=2)	2.Barnett 2020 (n=23)	3.Choi 2021 (n=3)	4.Christians. 2021 (n=54)	5.Eccles 2021 (n=25)	6.Forsman 2018 (n=6)	7.Fu 2022 (n=13)	8.Gardiner 2018 (n=6)	9.Heins 2021 (n=3)	10.Hickin 2021 (n=31)	11.Jin 2021 (n=6)	12.Li 2018 (n=4)	13.Ma 2020 (n=30)	14.McElfresh 2021 (n=7)	15.Osborn 2021 (n=5)	16.Poscia 2018 (n=2)	17.Quan 2020 (n=5)	18.Shah 2021 (n=5)	19.Shvedko 2018 (n=7)	20.Siette 2017 (n=5)	21.Teoh 2021 (n=8)	22.Tong 2021 (n=24)	23.Williams 2021 (n=45)	24.Wiwat. 2021 (n=4)	25.Zagic 2021 (n=58)	# Times included
Klingman 1993					√																					1
Kremers 2006				√						√												√	√		√	5
Käll 2020				√						√															√	3
Lai 2020							√			√												√				3
Lara 2016			√																							1
Larsen 2019				√	√																					2
Larsson 2016				√														√								2
Leavitt 2019				√																						1
Lee 2019																					√					1
Leff 2009					√																					1
Lindsay 2019				√						√											√				√	4
Lliffe 2014																			√							1
Lloyd-Evans 2020		√								√																2
Lokk 1990																						√	√			2
Loucks 2020										√																1
Macintyre 1999																						√				1
Macintyre 2002																				√						1
Maki 2012																			√				√			2
Marashian 2012				√																						1
Marder 1996		√																								1
Margalit 1995					√																					1
Marzillier 1976													√													1
Mascaro 2016										√																1
Mascaro 2018																					√					1

	1.Abbott 2019 (n=2)	2.Barnett 2020 (n=23)	3.Choi 2021 (n=3)	4.Christians. 2021 (n=54)	5.Eccles 2021 (n=25)	6.Forsman 2018 (n=6)	7.Fu 2022 (n=13)	8.Gardiner 2018 (n=6)	9.Heins 2021 (n=3)	10.Hickin 2021 (n=31)	11.Jin 2021 (n=6)	12.Li 2018 (n=4)	13.Ma 2020 (n=30)	14.McElfresh 2021 (n=7)	15.Osborn 2021 (n=5)	16.Poscia 2018 (n=2)	17.Quan 2020 (n=5)	18.Shah 2021 (n=5)	19.Shvedko 2018 (n=7)	20.Siette 2017 (n=5)	21.Teoh 2021 (n=8)	22.Tong 2021 (n=24)	23.Williams 2021 (n=45)	24.Wiwat. 2021 (n=4)	25.Zagic 2021 (n=58)	# Times included
Mason 2016					√																					1
Massia-Warner 2005					√								√													2
Mattanah 2010				√	√																					2
Matthews 2018					√					√					√											3
Matz-Costa 2018									√																	1
McAuley 2000																							√			1
McWirther 1996																							√		√	2
Mendelson 2013													√													1
Morrow 1998																						√				1
Morton 2018																		√						√		2
Mountain 2014						√	√													√		√	√			5
Mountain 2017																							√			1
Mutrie 2012																			√				√			2
Neil-Sztramko 2020																								√		1
Nelson 2019							√							√												2
Ollonqvist 2008				√				√											√			√				4
O'Mahen 2014													√													1
Orchard 1986				√																						1
Pandya 2019																					√					1
Pos 2019		√																								1
Pot-Kolder 2018		√																								1
Priebe 2020		√																								1
Purohit 2016					√																					1
Quayle 2001					√																					1

	1.Abbott 2019 (n=2)	2.Barnett 2020 (n=23)	3.Choi 2021 (n=3)	4.Christians. 2021 (n=54)	5.Eccles 2021 (n=25)	6.Forsman 2018 (n=6)	7.Fu 2022 (n=13)	8.Gardiner 2018 (n=6)	9.Heins 2021 (n=3)	10.Hickin 2021 (n=31)	11.Jin 2021 (n=6)	12.Li 2018 (n=4)	13.Ma 2020 (n=30)	14.McElfresh 2021 (n=7)	15.Osborn 2021 (n=5)	16.Poscia 2018 (n=2)	17.Quan 2020 (n=5)	18.Shah 2021 (n=5)	19.Shvedko 2018 (n=7)	20.Siette 2017 (n=5)	21.Teoh 2021 (n=8)	22.Tong 2021 (n=24)	23.Williams 2021 (n=45)	24.Wiwat. 2021 (n=4)	25.Zagic 2021 (n=58)	# Times included
Ransom 2008										√																1
Rantanen 2015																				√						1
Regev 2005					√																					1
Rigney et al 2017														√												1
Ristolainen 2020																						√				1
Rivera 2007		√											√													2
Roberts 2014		√																								1
Robinson 2013	√			√												√	√						√		√	6
Rodriguez-Rom. 2020																									√	1
Rohde 2004					√																					1
Rook 2003																									√	1
Rotondi 2005													√													1
Routasalo 2008								√																		1
Routasalo 2009				√																		√				2
Saito 2012								√								√						√	√			4
Samarel 2002														√												1
Samhkaniyan 2015				√																						1
Samulski 2004				√																						1
Sanchez 2017					√																					1
Saulsberry 2013															√											1
Savelkoul 2003																						√				1
Sayied 2015				√																						1
Schene 1993													√													1
Schulz 1976																							√			1

	1.Abbott 2019 (n=2)	2.Barnett 2020 (n=23)	3.Choi 2021 (n=3)	4.Christians. 2021 (n=54)	5.Eccles 2021 (n=25)	6.Forsman 2018 (n=6)	7.Fu 2022 (n=13)	8.Gardiner 2018 (n=6)	9.Heins 2021 (n=3)	10.Hickin 2021 (n=31)	11.Jin 2021 (n=6)	12.Li 2018 (n=4)	13.Ma 2020 (n=30)	14.McElfresh 2021 (n=7)	15.Osborn 2021 (n=5)	16.Poscia 2018 (n=2)	17.Quan 2020 (n=5)	18.Shah 2021 (n=5)	19.Shvedko 2018 (n=7)	20.Siette 2017 (n=5)	21.Teoh 2021 (n=8)	22.Tong 2021 (n=24)	23.Williams 2021 (n=45)	24.Wiwat. 2021 (n=4)	25.Zagic 2021 (n=58)	# Times included
Schwinden 2014				√																						1
Shapira 2007						√	√				√															3
Shapira 2021							√																			1
Shaui 1981				√																						1
Sheridan 2015		√																							√	2
Shima 2016				√																						1
Shvedko 2020																									√	1
Silverman 2014		√											√													2
Slegers 2007						√																				1
Slegers 2008						√	√				√											√	√	√		6
Sollami 2017																	√									1
Solomon 1995													√													1
Stice 2010					√																					1
Stravynski 1982													√													1
Struchen 2011																									√	1
Tabrize 2016				√						√				√											√	4
Taube 2018				√																						1
Terzian 2013		√											√													2
Thamboo 2016				√																						1
Theeke 2016				√						√															√	3
Thomas 2016				√																					√	2
Tsai 2010				√																			√		√	3
Tsai 2011				√							√												√			3
Tsai 2015											√															1

	1.Abbott 2019 (n=2)	2.Barnett 2020 (n=23)	3.Choi 2021 (n=3)	4.Christians. 2021 (n=54)	5.Eccles 2021 (n=25)	6.Forsman 2018 (n=6)	7.Fu 2022 (n=13)	8.Gardiner 2018 (n=6)	9.Heins 2021 (n=3)	10.Hickin 2021 (n=31)	11.Jin 2021 (n=6)	12.Li 2018 (n=4)	13.Ma 2020 (n=30)	14.McElfresh 2021 (n=7)	15.Osborn 2021 (n=5)	16.Poscia 2018 (n=2)	17.Quan 2020 (n=5)	18.Shah 2021 (n=5)	19.Shvedko 2018 (n=7)	20.Siette 2017 (n=5)	21.Teoh 2021 (n=8)	22.Tong 2021 (n=24)	23.Williams 2021 (n=45)	24.Wiwat. 2021 (n=4)	25.Zagic 2021 (n=58)	# Times included
Tsai 2020				√			√				√														√	4
Tse 2010																							√		√	2
Tse 2014																	√									1
Van Gestel 2012										√																1
van Rossum 1993																							√			1
Vanoh 2019									√																	1
Vassilopoulos 2018					√																					1
Walshe 2016																				√						1
Westerhof 2017																	√									1
Westerhof 2018																							√			1
White 2002						√																√	√		√	4
Winstead 2014				√																			√			2
Wood 1984				√																						1
Woodward 2011						√																	√			2
Wu 2015												√														1
Xu 2016												√														1
Yi 2012																						√				1
Yu 2019									√																	1
Zang 2013													√													1
Zang 2014													√													1
Zara 2017										√																1
Zhang 2016					√																					1
Zhang 2018				√						√					√						√		√		√	6

Table. Excluded studies and reasons for exclusions

Author data	**Reason for exclusion**
Abdi 2017 (1)	No SR of RCTs
Alexandra 2018 (2)	No SR of RCTs
Antunes 2019 (3)	No SR of RCTs
Ashaari 2021 (4)	Not in English or Scandinavian language
Astell-Burt 2022 (5)	No SR of RCTs
Austin 2021 (6)	Wrong or no outcomes of interest
Bellido (7)	Record not found
Baker 2018 (8)	No SR of RCTs
Banbury 2018 (9)	Wrong or no outcomes of interest
Bauer 2021 (10)	Wrong or no outcomes of interest
Bellido 2022 (7)	Record not found
Bermeja 2018 (11)	Not in English or Scandinavian language
Bessaha 2020 (12)	No SR
Bochicchio 2022 (13)	No SR of RCTs
Boldi 2021 (14)	Wrong or no outcomes of interest
Boldig 2021 (15)	Wrong or no outcomes of interest
Boldt 2021 (16)	Wrong or no outcomes of interest
Bong 2018 (17)	No SR
Bourne 2021 (18)	Wrong or no outcomes of interest
Brimelow 2017 (19)	No SR
Brooks 2018 (20)	No SR of RCTs
Bursky 2021 (21)	No SR
Casanova 2021 (22)	No SR
Chang 2021 (23)	Wrong or no outcomes of interest
Chipps 2017 (24)	No SR
Clements 2019 (25)	No SR of RCTs
Coll-Planas 2017 (26)	Wrong or no outcomes of interest
Donaldson 2022 (27)	Only 1 RCT, covered by other reviews (28, 29)
Dworschak 2022 (30)	Wrong or no outcomes of interest
Ellis 2021 (31)	No SR of RCTs
En 2022 (32)	Wrong or no outcomes of interest
European Observatory on Health 2019 (33)	No SR of RCTs
Foettinger 2022 (34)	No SR of RCTs
Forgeron 2018 (35)	Wrong or no outcomes of interest
G 2022 (36)	Wrong or no outcomes of interest
Galustyants 2022	Discontinued and unpublished
Garcia 2022 (37)	No SR
Gerrity 2019 (38)	Wrong or no outcomes of interest
Gilmour 2020 (39)	No SR of RCTs
Gonzalez-Mora 2022 (40)	Record not found
Hall 2019 (41)	No SR
Handley 2021 (42)	No SR of RCTs

Hards 2022 (43)	No SR of RCTs
Hewson 2022 (44)	Record not found
Holttum 2018 (45)	No SR
Ibarra 2020 (46)	No SR of RCTs
Ibrahim 2021 (47)	No SR
Ilgaz 2019 (48)	Wrong or no outcomes of interest
Ingram 2020 (49)	No SR of RCTs
Isabet 2021 (50)	No SR
Jagroep 2022 (51)	Wrong or no outcomes of interest
Jain 2020 (52)	Wrong or no outcomes of interest
Jenni 2019 (53)	Wrong or no outcomes of interest
Johnstone 2021 (54)	Wrong or no outcomes of interest
Jong 2022 (55)	Record not found
Koller 2021 (56)	No SR of RCTs
Kuru Alici 2020 (57)	No SR of RCTs
Kusumota 2022 (58)	Not in English or Scandinavian language
Larsson 2020 (59)	No SR
Latikka 2021 (60)	No SR
Li 2022 (61)	No SR
Li 2022 (62)	Record not found
Lindsay 2018 (63)	Wrong or no outcomes of interest
Littlewood 2022 (64)	No SR
Lobbia 2019 (65)	Wrong or no outcomes of interest
Manjunath 2021 (66)	No SR
Mann 2017 (67)	No SR
Marciano 2021 (68)	No SR of RCTs
Mathewson 2022 (69)	Discontinued and unpublished
McConnell 2022 (70)	Record not found
Mikkelsen 2019 (71)	No SR of RCTs
Moore 2018 (72)	Wrong or no outcomes of interest
Moriarty 2017 (73)	No SR
Murray 2022 (74)	Wrong or no outcomes of interest
Nnabuko 2018 (75)	Wrong or no outcomes of interest
Noone 2020 (76)	No SR of RCTs
Pallavicini 2022 (77)	No SR of RCTs
Pan 2021 (78)	No SR
Pathrose 2021 (79)	No SR of RCTs
Pearce 2021 (80)	No SR
Peters 2021 (81)	No SR of RCTs
Pool 2017 (82)	No SR
Portz 2017 (83)	Wrong or no outcomes of interest
Pu 2019 (84)	Wrong or no outcomes of interest
Puyat 2020 (85)	Wrong or no outcomes of interest
Qi 2022 (86)	Record not found
Reinhardt 2021 (87)	No SR

Sen 2022 (88)	No SR of RCTs
Shakya 2022 (89)	No SR
Shishehgar 2019 (90)	No SR
Song 2019 (91)	No SR
Strudwick 2021 (92)	No SR of RCTs
Takahashi 2022 (93)	Record not found
Tan 2022 (94)	Record not found
Thompson 2022 (95)	No SR of RCTs
Timko Olson 2020 (96)	Wrong or no outcomes of interest
Todd 2022 (97)	No SR
Tricco 2022 (98)	No SR of RCTs
Van der Meulen 2021 (99)	No SR of RCTs
Veazie 2019 (100)	Wrong or no outcomes of interest
Velloze 2022 (101)	No SR
Victor 2018 (102)	No SR
Vidovic 2021 (103)	No SR
Villalonga-Olives 2022 (104)	No SR
Wang 2022 (105)	Wrong or no outcomes of interest
Webber 2017 (106)	No SR
Williams 2022 (107)	No SR of RCTs
Wilson 2018 (108)	No SR
Zhang 2021 (109)	No SR of RCTs
Zhong 2020 (110)	No SR of RCTs
Zollick 2021 (111)	Not in English or Scandinavian language

Note: SR = Systematic review. “No SR” = Not meeting our criteria for a SR (clear PICO, risk of bias assessments, comprehensive search strategy). “No SR of RCTs” = The SR do not include RCTs. “Wong or no outcomes of interest” = The SR do not include RCTs on loneliness and/or social isolation. “Discontinued and unpublished” = The authors have notified us (via email) that their work on the SR was discontinued before completion. Record not found = authors were contacted three times, without response.

Table. Ongoing systematic reviews

Author	Title	Status/Intervention type
Bagnall	Five-year update of systematic review of community infrastructure (places and spaces) to boost social relations and community wellbeing	Writing phase/Structural
Bordini	Digital interventions to reduce loneliness and social isolation among young adults: a systematic review	Writing phase/Digital
Butler	The effect of social prescribing on reducing social isolation and loneliness in community-dwelling older people: a systematic review of experimental studies	Unknown/Social network
Butz	Social isolation in the elderly: What measures can prevent or counteract social isolation?	Unknown/Mix
Cadth Medical Devices	Peer support programs for youth mental health: a systematic review as part of a Canadian Health Technology Assessment	Writing phase/Social support
Cai	Connected through music: a systematic review of the use of music to reduce loneliness during the COVID-19 pandemic	Under review/Social network
Domenicucci	Efficacy of ICT-based interventions in improving psychological outcomes among older adults with MCI and dementia: a systematic review and meta-analysis	In press/digital
Eddy	Cognitive or behavioural interventions (or both) to prevent or mitigate loneliness and depression: a systematic review and sequential meta-analysis	Unknown/Mix
Egan	Digital technologies to prevent social isolation and loneliness in dementia: a systematic review	Under review/Digital
Elhag	Exploring the impact of real-world interventions on healthy older adults' physical health, psychological wellbeing, and social connections: a systematic review	Writing phase/Mix
Ellard 2021	Interventions Addressing Loneliness Among University Students: A Systematic Review	In press/Mix
Garcia	The effectiveness of positive psychology interventions on the subjective well-being and psychosocial experience in people with autism spectrum disorder: A systematic review	Under review/Psychological
HaGani	The impact of interventions to improve social-wellbeing upon health care utilization: a systemic review and meta-analysis	Writing phase/Mix
Hollands	A systematic review of the measurement and management of the group processes within group-based interventions that aim to prevent loneliness in older people	Writing phase/Mix
Huang	Exploring the effectiveness of physical activity interventions on undergraduate university students' mental health, wellbeing, stress, and coping: A systematic review	Data extraction/Physical
Haas	A systematic review of peer support interventions designed to improve student wellbeing and mental health at university	Submission/Social support
Kardosod	The Effectiveness of Self-management eHealth intervention versus Usual Care on Psychological Adjustment Health-related Quality of Life with Cancer Survivors: A Systemic Review and meta-analysis Protocol	Under review/Digital

Author	Title	Status/Intervention type
Kiely	Effectiveness of link workers providing social prescribing on health outcomes and costs for adult patients in primary care and community settings. A protocol for a systematic review of the literature	Unknown/Social prescribing
Laermans 2020	PROTOCOL: Friendly visiting by a volunteer for reducing loneliness and social isolation in older adults	Under review/Social support
Marfell	The effectiveness of community-based interventions designed to reduce loneliness amongst adults: a systematic review	Writing phase/Structural
McArthur	Management of Social Isolation and Loneliness in Older Adults: A Systematic Review and Network Meta-analysis of Randomized Controlled Trials	Unknown/Mix
McMillan	Interventions to reduce social isolation and loneliness in older adults: a systematic review and meta-analysis	Published/Mix
Miake-Lye	Health Care Interventions to Prevent or Reduce Loneliness and Social Isolation: A Systematic Review	Under review/Health care
Morrish	What works and why in interventions targeting loneliness: a systematic review of intervention characteristics	Writing phase/Mix
Quinn	The association between group-based arts interventions and health and wellbeing outcomes in older adults. A systematic review and meta-analysis	Under review/Social network
Sin	Effects of non-pharmacological interventions on loneliness among community-dwelling older adults: a systematic review, network meta-analysis, and meta-regression	Under review/Mix
Stojkov	Systematic review of decision-analytic modeling studies on nature-based social prescribing or loneliness reducing interventions	Writing phase/Social prescribing
Swinkels	The effectiveness of social network interventions for psychiatric patients: a meta-analysis	Under review/Social network
Tao	Effects of non-pharmacological interventions on the mental health among the older people with frailty: a systematic review and meta-analysis	Under review/Mix
Tcymbal	Interventions promoting social participation and physical activity in community living older adults: systematic review	Revise & resubmit/Mix
Tshikaya	A systematic review and meta-analysis of the effectiveness of augmented reality, mixed reality and virtual reality mindfulness-based interventions for improving psychological outcomes in people with mental and physical health conditions	Writing/Digital (Mindfulness)
Vasquez	Loneliness, perceived social support and perinatal mental health: a systematic review of interventional studies	Under review/Mix
Wolters	Interventions that address social connection and isolation for people with Acquired Brain Injury: a systematic review (PhD thesis)	Under review/Mix

Figure X. PRISMA flow diagram

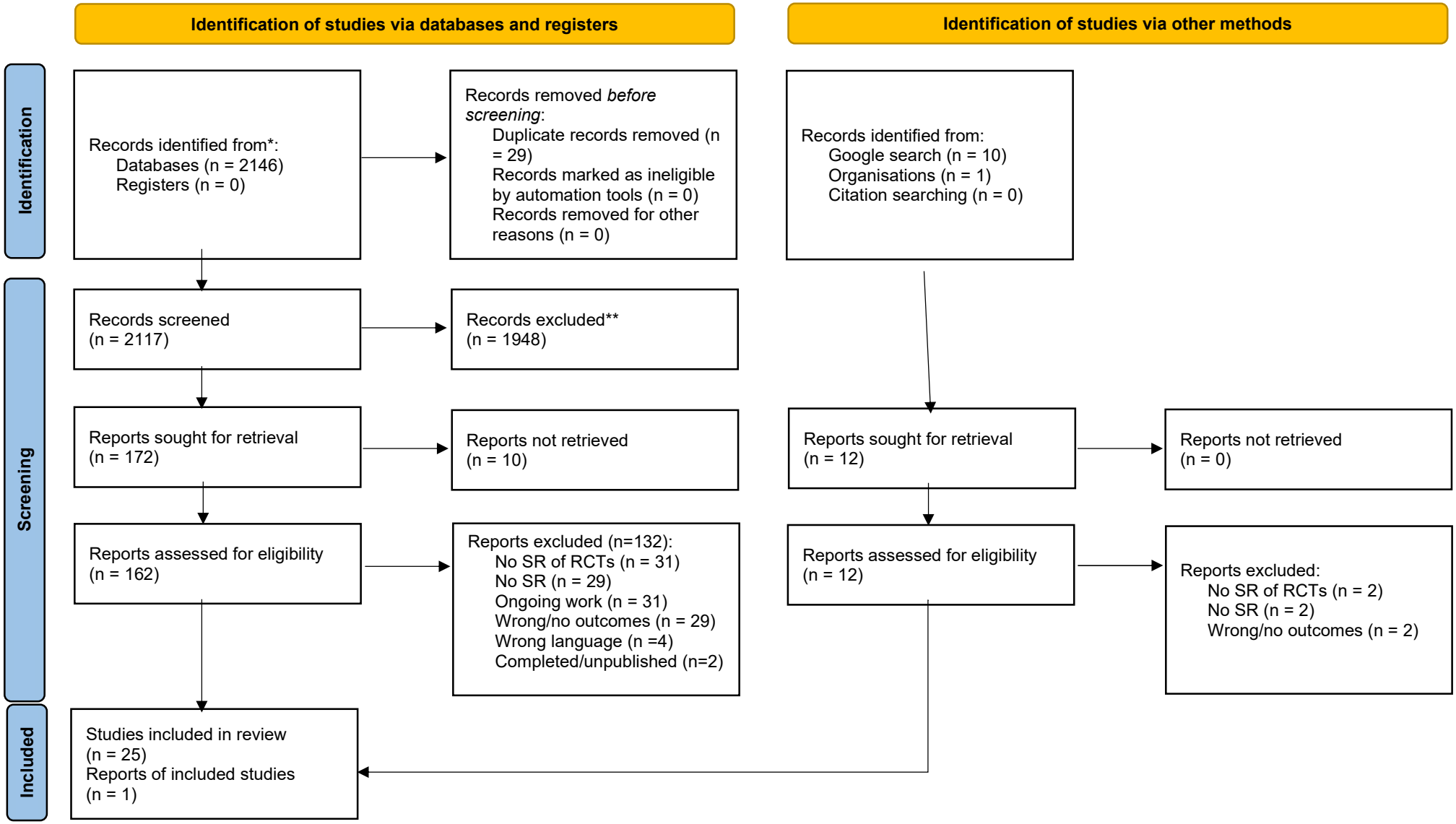

Figure X. Critical appraisal of included systematic reviews: AMSTAR II consensus results

	AMSTAR 2 DOMAIN																Overall rating of quality	
AUTHOR DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	weakness in domains that ar non-critical	critical
Reviews with meta-analysis																		
Abbott 2019	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	2
Christiansen 2021	1	2	0	2	1	1	0	1	2	0	1	1	1	1	1	1	2	1
Eccles 2021	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1
Fu 2022	1	1	0	1	1	1	0	1	2	0	1	1	1	1	1	1	2	1
Hickin 2021	1	1	1	1	1	1	0	2	1	0	1	1	1	1	1	1	1	1
Jin 2021	1	0	1	1	1	1	0	1	2	0	1	1	1	1	0	1	1	3
McElfresh 2021	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Shah 2021	1	2	0	1	1	1	0	2	1	0	1	1	0	1	0	1	2	3
Shvedko 2018	1	2	0	2	1	1	2	2	1	0	1	1	1	1	1	1	2	0
Siette 2017	1	0	1	1	1	1	1	1	1	0	1	1	0	0	1	1	2	2
Teoh 2021	1	1	1	1	1	1	0	2	2	0	1	1	1	1	1	1	1	1
Wiwatkunupakarn 2021	1	0	1	1	1	1	0	1	1	0	0	0	0	0	0	1	3	5
Zagic 2021	1	1	1	1	1	1	0	1	2	0	1	1	1	1	1	1	1	1
Reviews without meta-analysis																	0	0
Barnett 2020	1	1	0	2	1	1	1	1	1	1	N/A	N/A	N/A	1	N/A	1	1	0
Choi 2021	1	1	0	1	1	1	0	1	1	0	N/A	N/A	N/A	1	N/A	1	2	1
Forsman 2018	1	0	0	1	1	1	0	2	1	0	N/A	N/A	1	0	N/A	1	3	2
Gardiner 2018	1	0	1	1	1	0	0	1	1	0	N/A	N/A	0	0	0	1	3	4
Heins 2021	1	1	0	1	1	1	0	1	1	0	N/A	N/A	1	1	0	1	2	2
Li 2018	1	0	1	1	0	0	0	1	1	0	N/A	N/A	1	0	0	1	4	3
Ma 2020	1	0	1	1	1	1	0	1	2	0	N/A	N/A	1	0	0	1	2	3
Osborn 2021	1	0	0	1	1	1	0	1	1	0	N/A	1	1	0	0	1	3	3
Poscia 2018	1	0	0	1	1	0	0	1	1	0	N/A	N/A	0	0	0	1	4	4
Quan 2020	1	0	0	1	1	0	0	2	1	0	N/A	N/A	0	0	0	1	4	4
Tong 2021	1	0	1	1	1	1	0	0	2	0	N/A	NA	1	1	N/A	1	2	2
Williams 2021	1	1	0	1	1	1	0	1	1	0	N/A	1	0	0	N/A	1	3	2

1. PICO — Did the research questions and inclusion criteria for the review include the components of PICO? (yes/no)
2. Protocol — Was a complete protocol written? (yes/partial yes/no)
3. Study design — Did the authors explain their selection of the study designs for inclusion in the review? (yes/no)
4. Search strategy — Comprehensive search strategy? (yes/partial yes/no)
5. Study selection — In duplicate? (yes/no)
6. Data extraction — In duplicate? (yes/no)
7. Excluded studies — List of excluded studies and justification? (yes/partial yes/no)
8. Included studies — Included studies described in detail? (yes/partial yes/no)

9. RoB assessment	Risk of bias assessed? (yes/partial yes/no)
10. Funding sources	Reported? (yes/no)
11. Meta-analysis	Appropriate methods used? (yes/no/no meta-analysis)
12. Impact of risk of bias	Was impact on results assessed? (yes/no/no meta-analysis)
13. Discussing risk of bias	Was potential effects of bias discussed? (yes/no/no meta-analysis)
14. Heterogeneity	Discussion of heterogeneity? (yes/no)
15. Publication bias	Investigated? (yes/no/no meta-analysis)
16. Conflict of interest	Did the review authors report any? (yes/partial yes/no)

Methodological require
met
Methodological require
Methodological require
Not applicable (no meta
analysis)

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