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ARTICLE

A meta-analysis of coping strategies and psychological distress in rheumatoid arthritis

Rebecca Hinch[1] | **Fuschia M. Sirois**[2]

[1]University of Sheffield, Sheffield, UK

[2]Durham University, Durham, UK

Correspondence
Fuschia M. Sirois, Department of Psychology, Durham University, Upper Mountjoy, South Rd, Durham DH1 3LE, UK.
Email: fuschia.sirois@durham.ac.uk

Abstract

Purpose: Theory and research indicate that coping plays a central role in the experience of psychological distress in people with rheumatoid arthritis (RA). This study meta-analysed the associations of adaptive and maladaptive coping strategies with psychological distress in people with RA to quantify and better understand the proposed differential relationships, as well as the factors that might influence these links.

Methods: Searches of four databases identified eligible studies according to a pre-registered protocol. Two random effects meta-analyses examined the direction and magnitude of the links between adaptive coping (problem-focused and emotional approach coping) and maladaptive coping (emotional avoidance and pre-occupation coping) and psychological distress (stress, anxiety, and depression). Study quality was evaluated using a bespoke tool. Moderator analyses for sample characteristics and distress type were conducted.

Results: Searches identified 16 eligible studies with 46 effects. Meta-analysis of maladaptive coping and distress yielded a significant, medium sized association, $k = 12$, $r = .347$, 95% CIs [.23, .46]. Moderator analyses were significant only for type of distress, with effects for depression being larger than that for combined distress. Effects did not vary as a function of age, participant sex, or disease duration. Meta-analysis for adaptive coping was not significant, $k = 10$, $r = -.155$, 95% CIs [−.31, .01].

Conclusions: Findings from this first meta-analysis of coping and distress in RA indicate that maladaptive but not adaptive coping is associated with greater distress. Further research is needed to grow the evidence base to verify the current findings especially with respect to adaptive coping.

KEYWORDS
coping strategies, psychological distress, rheumatoid arthritis

BACKGROUND

Rheumatoid arthritis (RA) is a chronic, systemic, autoimmune disease characterized by joint pain, swelling, stiffness, and progressive joint destruction (McInnes & Schett, 2011). It is the most common form of inflammatory arthritis, affecting over 400,000 individuals in the United Kingdom (Symmons et al., 2002), and around .24% of the global population (Cross et al., 2014). Like many chronic health conditions, RA is akin to living with a chronic stressor and can have a significant impact on wellbeing (Barskova & Oesterreich, 2009). Indeed, the prevalence of psychological distress, defined as depression, anxiety, or general stress, is greater in those with RA than the general population, with estimates ranging between 13% and 20% (Dickens et al., 2002; Gettings, 2010; Pincus et al., 1996).

The relationship between RA symptoms and psychological distress is bidirectional. The symptoms and stressors associated with RA impact psychological wellbeing, and psychological distress can influence inflammatory processes (Cohen et al., 2012), exacerbating disease activity and severity (Matcham et al., 2018), and increasing fatigue, functional impairment, and pain (Jamshidi et al., 2016; Majnik et al., 2022; Sharpe et al., 2001). Given these bidirectional relationships, a biopsychosocial approach to managing RA is crucial for adjustment (Keefe et al., 2002).

As RA often involves physical disability and functional deterioration (Strand & Khanna, 2010), coping resources are essential for successfully managing everyday tasks and stressors (Lok et al., 2010). Indeed, in RA samples, maladaptive coping styles are linked to greater expectations of arthritis-related disability (Felton & Revenson, 1984; Ferrari & Russell, 2010). Coping therefore plays a central role in the experience of psychological distress in people with RA.

Classic transactional models of coping conceptualize coping as "constantly changing cognitive and behavioural efforts to manage specific internal and/or external demands that are appraised as taxing or exceeding the resources of the person" (p.141; Lazarus & Folkman, 1984). Central to this transactional model is the notion that appraisals of the stressor play a key role both in the stress experienced and the choice of coping strategies to deal with the stressor. The effectiveness of the coping strategies chosen in turn influences appraisals of both the stressor and of the individual's own ability to cope with the difficult situation. For example, if an individual feels they lack the resources to cope with a challenging situation, such as living with a chronic disease, the disease is likely to be interpreted as a permanent threat to which they feel helpless to influence and they are likely to use passive or avoidant coping strategies which can contribute to depressive symptoms (Abramson et al., 1978).

From this view of coping, various coping taxonomies have been proposed such as problem-focused versus emotion-focused (Lazarus & Folkman, 1984), engagement versus disengagement (Roth & Cohen, 1986), and accommodative versus meaning-focused (Skinner et al., 2003). However, classification methods have been criticized for failing to integrate all coping styles, or for placing coping styles across multiple categories (Stanisławski, 2019). Additionally, there is theory and research which also suggest that emotion-focused strategies can lead to positive outcomes in the context of health issues, and are therefore not always problematic (Austenfeld & Stanton, 2004).

The choice of coping taxonomy for this review was guided by the approach proposed by Ewert et al. (2021), which was effectively applied in a meta-analysis of 136 samples to understand how self-compassion relates to coping. This taxonomy classifies coping into two broad categories: adaptive coping and maladaptive coping (see Figure 1). Coping strategies which involve turning towards the stressor (for example, those considered either problem-focused or emotion-focused) are considered adaptive, as theory and research suggest that these are more likely to bring about enduring change and long-term positive psychological outcomes (Skinner et al., 2003). Adaptive strategies can involve taking action or seeking the resources to tolerate or manage the stressor (Lazarus & Folkman, 1984). Conversely, coping

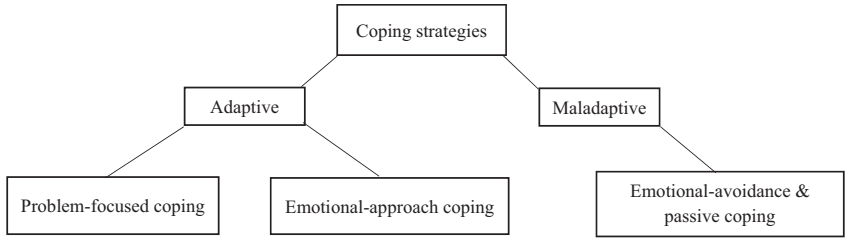

FIGURE 1 Hierarchical classification of coping strategies.

styles that involve turning the focus of attention away from the stressor (e.g., emotional-avoidance strategies including denial or behavioural disengagement), or that put too much focus on the stressor without taking action to resolve it (e.g. catastrophising), are considered maladaptive as these strategies fail to have a lasting impact on the threat that has triggered the distress, thereby prolonging the source of distress (Smyth et al., 2013; Stanton et al., 2000).

In the context of chronic pain conditions like RA, some researchers propose that psychological well-being is primarily determined by the individual's coping strategies and beliefs (Geisser et al., 1999). From this perspective maladaptive coping and beliefs are more important determinants of adjustment to chronic pain than adaptive coping and beliefs.

Maladaptive coping and beliefs about pain can also influence whether individuals engage with adaptive coping strategies. Consequently, the use of maladaptive coping may impair any positive benefits of adaptive coping styles. Indeed, under chronic pain conditions, the link between maladaptive coping and depression is stronger than that for adaptive coping and depression (Tan et al., 2011), whereas under conditions such as diabetes and multiple sclerosis, the links between adaptive coping and higher wellbeing, and maladaptive coping and poorer wellbeing, appear to be equally strong (Duangdao & Roesch, 2008; Grech et al., 2018). This supports the notion that maladaptive coping may be a more important contributor to distress than adaptive coping in people with RA.

A previous systematic provides some support for the proposed differential linkages between adaptive and maladaptive coping and distress in RA. Vriezekolk et al. (2011) found that avoidant-oriented coping styles were associated with later psychological distress, but approach-oriented coping styles were not associated with later distress. However, several issues with this review warrant scrutiny of its findings. Firstly, the coping taxonomy used - engagement-coping versus disengagement-coping - was not consistent with the Lazarus and Folkman (1984) model of coping and stress. Some strategies that were classified as engagement-coping (distraction and negative emotion-focused coping) may reflect maladaptive rather than adaptive coping because they do not fully address the gap between the stressors' demands and the individuals' resources to deal with these demands. Secondly, engagement coping strategies were broadly construed and included emotion regulation skills. The conceptual overlap between coping strategies and emotion regulation is subtle yet important to consider. The latter focuses specifically on the intra-personal processes aimed at up or down-regulating emotional states (Gross & Thompson, 2007), whereas coping involves responding to the demands of a stressful situation through utilizing both internal and external resources. Including studies with emotion regulation in the review may have therefore attenuated or inflated the overall findings. Thirdly, the review by Vriezekolk et al. (2011) summarized findings from studies that did and did not control for confounding factors, which may have biased the outcomes of review. Lastly, their review did not quantify the associations between coping and distress, or test for possible factors that may influence the magnitude of these associations. Gaining insight into the magnitude and nature of the association between different coping styles and distress is important for informing interventions to ease the burden of psychological distress prevalent in those with RA. We argue that these issues warrant further investigation to understand the role of coping in adjustment to RA.

THE CURRENT STUDY

To address these issues, we conducted meta-analyses of the associations of adaptive and maladaptive coping styles with psychological distress in individuals with RA. Following Ewert et al. (2021) we investigated the associations of adaptive coping (emotional-approach and problem-focused strategies) and maladaptive coping (emotional-avoidance and emotional pre-occupation strategies) with indicators of psychological distress (depression, anxiety and distress). Consistent with theory and previous research we expected that adaptive coping would be negatively associated with distress, whereas maladaptive coping would be positively associated with distress.

To gain further insight into the factors that may amplify or attenuate these proposed associations we conducted moderator analyses, and examined sample-based moderators (participant sex, age, and disease duration), and a methodological moderator (type of distress). Because research suggests that the relationship between adaptive coping and lower distress is stronger in women than in men (Hamid et al., 2023), and maladaptive coping is associated with greater distress in women than men (Hamid et al., 2023; Osei-Kuffour & Peprah, 2020; Zukerman et al., 2017), we examined participant sex as a moderator. There is also evidence that the relationship between coping and psychological distress may vary as a function of age (Duangdao & Roesch, 2008; Matt & Dean, 1993), and disease duration (Smári & Valtýsdóttir, 1997), and so all of these were investigated as potential moderators. Lastly, because evidence suggests that the link between coping and distress varies as a function of how distress is defined (for example, depression versus anxiety: Dempster et al., 2015), the type of distress was tested as a potential moderator.

METHODS

Search strategy and study selection

The protocol for this meta-analysis was pre-registered on PROSPERO (https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023390492). Three electronic databases were searched without any date constraints: Scopus, MedLine, and PsycINFO. Additionally, the first ten pages of Google Scholar were searched to include the grey literature. The systematic search was conducted on 13th January 2023, and alerts were set up to retrieve any newly published studies between 13th January and 13th February 2023. An updated search was completed on 21st September 2023 and identified five additional articles, none of which met inclusion criteria.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (PRISMA; Moher et al., 2009) were followed during the screening process (Figure 2). Where available, the 'map term to search' heading was used, and subject headings were auto-exploded in PsycINFO and MedLine. Searches of titles, abstracts, and key words included variations of the following terms: cope OR coping; "psychological stress" OR "psychological distress" OR stress OR distress OR depress* OR anxiet*; "rheumat* arthritis."

Records identified for potential inclusion were screened for duplicates, and forward and backwards searches were conducted for relevant articles that met the inclusion criteria based on their titles and abstracts. The full texts of the remaining articles were then reviewed for eligibility, with reasons for rejection being recorded. The corresponding authors were contacted where possible for articles that were not accessible.

Eligible articles met the following criteria: (1) the article was available in English; (2) the study design was cross-sectional or longitudinal; (3) the study utilized quantitative or mixed methods; (4) participants had RA and were 18 years old or older; (5) the effects for participants with RA were discernible from those for participants with other types of arthritis; and (6) studies include a quantitative measure of coping styles, and psychological distress, anxiety, depression, stress, or general distress. Implementing these criteria, of 109 full text articles that were reviewed, 93 were excluded, leaving 16 studies reporting 46 effects for inclusion in the meta-analysis.

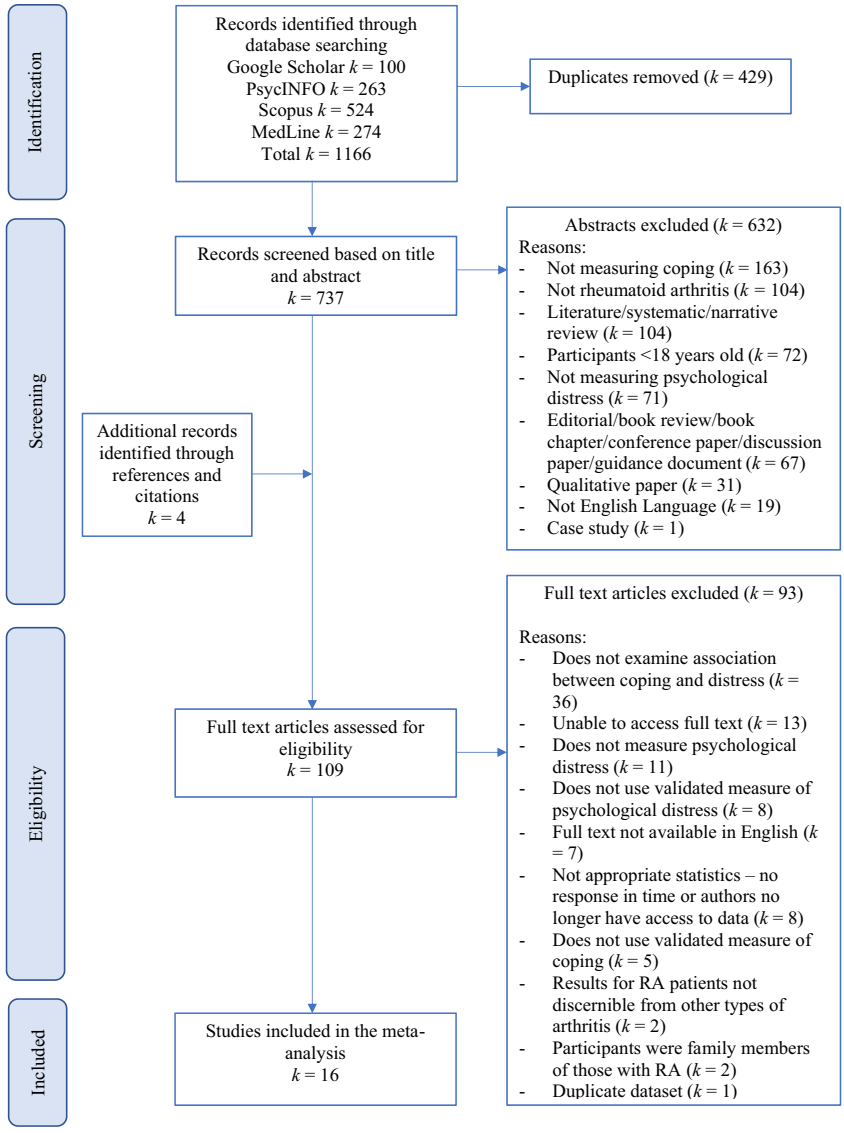

FIGURE 2 A PRISMA flow diagram (Moher et al., 2009) outlining the screening process.

Data extraction

Essential data were extracted from the eligible articles and recorded in a coding spreadsheet, including effect(s) and sample sizes, the author(s), year of publication, country of origin, available sample demographics (gender, mean age, mean disease duration), and measures used to assess psychological distress and coping styles. Pearson's product–moment correlation coefficient (*r*) was chosen as the effect size metric as it was the statistic reported across the majority of the studies. In longitudinal studies, baseline cross-sectional Pearson's correlation coefficients were extracted for analysis where available; otherwise, the first effect size in the time series was extracted to make the data analysed equivalent in design to that obtained from cross-sectional studies. Moderator information extracted for each study included a conceptual moderator (type of distress), and sample characteristic moderators (the percentage of female participants in the sample, and their age). A second reviewer independently coded a third of the included studies ($k = 6$). Inter-rater agreement was high (94.45%), with discrepancies resolved through discussion.

Quality assessment

Following the recommendations of Quintana (2015) a bespoke tool with questions deemed most relevant for this study was chosen from the Appraisal tool for Cross Sectional Studies (AXIS; Downes, et al., 2016) to assess the the methodological quality of the studies. The 11 questions evaluated aspects of the study design, sampling procedures, methods and measures used to produce a total score which was then categorized as as low (<6), moderate (6–8), or high (9–11) quality. Two raters independently evaluated the studies with the first rater assessing all studies, and the second rater assessing a random sample equalling a third of the articles.

Data synthesis

Two random-effects meta-analyses estimated the average associations of maladaptive coping and adaptive coping with distress using Comprehensive Meta-Analysis (CMA; Version 3; Borenstein et al., 2013). Almost all studies reported a Pearson's *r* statistic. Where studies reported other effect sizes, these were converted to an *r* value. Where more than one measure of psychological distress, or more than one measure of adaptive or maladaptive coping styles were reported, the CMA calculated weighted averages which were then converted into one combined effect size for each study, which is a common approach for this issue (Card, 2012). In line with Cohen's (1992) guidelines for the magnitude of effect sizes, $r = .10$ is considered small, $r = .30$ to be medium, and $r = .50$ to be large. Cochrane's Q and I^2 statistics (Higgins et al., 2003) were used to assess between study variability in effect sizes to assess whether moderator analyses were warranted. Q statistics assess the total variability among the pooled effect sizes (Card, 2012), with a significant Q statistic indicating that the heterogeneity in the sample is significantly more than can be explained by sampling error (Borenstein et al., 2010). I^2 statistics assess the proportion of variability that is unaccounted for by sampling error within studies (Higgins & Thompson, 2002). An I^2 value of 25% indicates low variance, 50% indicates moderate variance, and 75% or greater indicates high variance (Higgins et al., 2003).

Planned moderator analyses were conducted only for those effects that were significant to probe the sources of heterogeneity. For the categorical moderator, distress type, three or more studies were required in each subgroup to conduct the analyses, in accordance with the guidelines suggested by Card (2012). A mixed effects approach was taken with combined subgroups analysed first with a random effects model to evaluate heterogeneity within each subgroup, and then combined using a fixed effects model to evaluate the heterogeneity between subgroups. For continuous moderators (age, percent female participants, and illness duration) methods of moments meta-regressions were conducted with studies that did not report the necessary information excluded from the meta-regressions.

Publication bias

Guided by the recommendations of Card (2012), we took a multi-method approach to assess the extent to which non-inclusions of unfound studies may bias the results. Firstly, Egger's Regression test (Egger et al., 1997) was conducted to examine whether the association between estimated effect size and study size is greater than what would be expected to occur by chance, with a risk of publication bias being indicated by a significant intercept test value. We also used the 'trim-and-fill' method (Duval & Tweedie, 2004) to assess the asymmetry of the funnel plots which estimate and impute hypothetically missing studies to provide an adjusted bias-corrected summary effect. Publication bias is indicated if the imputed effects are not comparable to the original values (Card, 2012). Lastly, we calculated Rosenthal's (1979) fail-safe N to estimate the number of additional studies with non-significant effects that would need to be included to challenge the conclusion that was a significant effect. The fail-safe N was only calculated for those effects that reached statistical significance, in accordance with Borenstein et al.'s (2010) guidance. An adequately high fail-safe N was considered to be $5k + 10$, where k equates to the number of studies included. Using these multiple

TABLE 1 Characteristics of the 16 studies included in the two meta-analyses.

Author (year of publication)	Analysed sample size	Country of study	Study design	Mean age	% female	Disease duration (years)
Beckham et al. (1991)	65	United States	Cross-sectional	55.20	66.69	11.70
Benka et al. (2014)	248	Eastern Slovakia	Cross-sectional	56.52	81.45	16.08
Covic et al. (2006)	134	Australia	Cross-sectional	58.50	76.87	13.20
Curtis et al. (2004)	52	Ireland	Longitudinal	60.00	100	13.00
Curtis et al. (2005)	52	Ireland	Cross-sectional	60.00	100	13.00
Dobkin et al. (2008)	165	Canada	Cross-sectional	55.50	69.09	.58
Evers et al. (2002)	95	Netherlands	Longitudinal	57.00	70.53	—
Griffin et al. (2001)	56	United States	Longitudinal	55.00	64.29	—
Groarke et al. (2005)	75	Ireland	Cross-sectional	60.10	100	12.60
Keefe et al. (1989)	223	United States	Longitudinal	52.70	74.89	3.50
Lowe et al. (2008)	127	UK	Longitudinal	56.20	79.53	4.45
Smith and Wallston (1992)	239	United States	Longitudinal	50.50	76.15	3.20
Treharne et al. (2007)	154	UK	Longitudinal	55.44	75.37	7.29
van Lankveld et al. (2000)	109	Netherlands	Longitudinal	56.10	66.97	13.30
Ziarko et al. (2014)	210	Poland	Cross-sectional	54.92	83.81	12.40
Ziarko et al. (2019)	85	Poland	Cross-sectional	48.94	80.00	14.86

Note: — indicates required data not reported/obtainable.

approaches in tandem and arriving at a consensus among their results helps to reduce Type 1 error in assessing publication bias (Card, 2012).

RESULTS

Study characteristics

The 16 studies (and 43 effect sizes) included in the meta-analysis were conducted in eight countries, with the majority being conducted in the USA (see Table 1). Eight studies used a cross-sectional design, and eight were longitudinal. The mean age of the samples ranged from 48.94 to 60.10 years, with females comprising 64.29%–100% of the samples. Mean disease duration varied between .58 and 14.86 years. All studies used self-report measures to assess coping strategies and psychological distress (see Table 2). Ten different measures of coping strategies were used across the studies. Seven different measures of psychological distress were used, which reduced to six when excluding translations of the same measures. Despite searching the grey literature, all included studies were published and peer reviewed. Figure 3 presents the coping styles reported in the included studies, categorized according to the conceptual coping hierarchy.

Quality appraisal

The quality of the studies was appraised by two raters independently. The first rater rated all studies, and the second rater assessed a third of the studies ($k = 6$) selected at random. Inter-rater agreement was high

TABLE 2 Quality appraisal ratings and scores for the 16 studies in the meta-analyses.

Study	Quality appraisal questions											Overall score
	1	2	3	4	5	6	7	8	9	10	11	
Beckham et al. (1991)	1	x	x	1	1	x	1	1	1	0	1	7
Benka et al. (2014)	1	1	1	1	1	x	1	1	1	1	1	10
Covic et al. (2006)	1	1	0	1	1	0	1	1	1	0	1	8
Curtis et al. (2004)	1	x	0	1	0	0	1	1	1	0	1	6
Curtis et al. (2005)	1	x	0	1	1	x	1	1	1	0	1	7
Dobkin et al. (2008)	1	1	1	1	1	x	1	1	1	1	1	10
Evers et al. (2002)	1	1	1	1	1	1	1	1	1	1	1	11
Griffin et al. (2001)	1	1	1	1	1	x	1	1	1	1	1	10
Groarke et al. (2005)	1	1	1	1	0	0	1	1	1	1	1	9
Keefe et al. (1989)	1	x	0	1	1	x	1	1	1	0	x	6
Lowe et al. (2008)	1	1	0	0	x	x	1	1	1	0	1	6
Smith and Wallston (1992)	1	1	0	1	1	x	1	1	1	0	1	8
Treharne et al. (2007)	1	1	1	1	1	x	1	1	1	1	1	10
van Lankveld et al. (2000)	1	1	1	1	1	x	1	1	1	1	1	10
Ziarko et al. (2014)	1	x	0	1	0	0	1	1	1	0	0	5
Ziarko et al. (2019)	1	x	0	1	0	0	1	1	1	0	1	6

Note: 1 = yes, 0 = no.

Quality Appraisal questions: (1) Were the hypotheses/aims/objectives of the study clear? (2) Was the method of obtaining the data clearly described? (3) Were criteria for inclusion in the sample clearly defined? (4) Was the target/reference population clearly defined? (5) Was the sample taken from an appropriate population base so that it closely represented the target/reference population under investigation? (6) Was the selection process likely to select participants that were representative of the target/reference population under investigation? (7) Were the outcome variables measured using validated and reliable means? (8) Was the independent variable measured using validated and reliable means? (9) Was appropriate statistical analysis used? (10) Were the methods (including statistical methods) sufficiently described to enable them to be repeated? (11) Did the study describe any limitations?

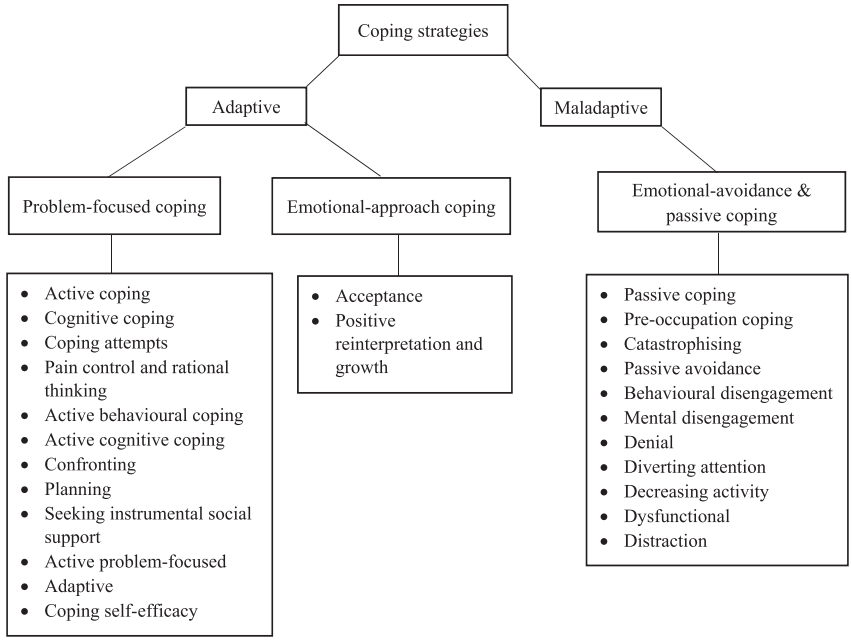

FIGURE 3 Hierarchical structure of the meta-analysed coping strategies.

(87.88%), and discrepancies were resolved through discussion. Most studies achieved either a moderate ($k = 10$) or high ($k = 8$) quality rating (Table 2), with only one study from the maladaptive coping meta-analysis being rated as low quality (Ziarko et al., 2014).

Meta-analyses

The data analysed from 16 studies with 46 effects included a pooled total sample of 1066 participants for adaptive coping (23 effects), and 1570 participants for maladaptive coping (23 effects). The meta-analysis found that the association between adaptive coping and psychological distress was not significant ($k = 10$, $r = -.155$, 95% CIs [−.31, .01]). Although there was evidence of high heterogeneity $Q(9) = 61.64$, $p = .000$; $I^2 = 85.40\%$, moderator analyses were not conducted due to the main effect being non-significant (Table 3).

For maladaptive coping, there was a significant medium-sized pooled association with psychological distress ($k = 12$, $r = .347$, 95% CIs [.23, .46], $p = .000$), with evidence of moderate heterogeneity $Q(11) = 69.61$, $p = .000$; $I^2 = 84.20\%$, indicating that moderator analyses were warranted.

Moderator analyses

The subgroup analysis for distress type indicated that the effects from studies assessed distress as depression ($k = 5$, $r = .454$, 95% CIs [.34, .56]; $p = .000$) were significantly different than those from studies that assessed a mixture of distress types ($k = 7$, $r = .250$; 95% CIs [.09, .40]; $p = .003$), $Q_{between}(1) = 4.36$, $p = .037$.

The associations between maladaptive coping and psychological distress did not vary as a function of participant gender ($b = .41$, 95% CIs [−.65, 1.47], $Q_{model}(1) = .58$, $p = .448$, $Q_{residual}(9) = 38.49$ $p = .000$), age ($b = .02$, 95% CIs [−.01, .06], $Q_{model}(1) = .00$ $p = .230$, $Q_{residual}(9) = 37.14$, $p = .000$), or disease duration ($b = -.01$, 95% CIs [−.03, .02], $Q_{model}(1) = .31$, $p = .580$, $Q_{residual}(7) = 37.14$, $p = .000$).

TABLE 3 Meta-analysed effect sizes of adaptive coping (AC) and maladaptive coping (MC) with psychological distress (PD).

Author (publication year)	*N*	Coping measures	Psychological distress measures	AC-PD *r*	95% CI	MC-PD *r*	95% CI
Beckham et al. (1991)	65	CSQ[a]	BDI	−.331	[−.53, −.10]	—	—
Benka et al. (2014)	248	CSE	HADS	−.481	[−.57, −.38]	—	—
Covic et al. (2006)	134	CSQ	CES-D	—	—	.500	[.36, .62]
Curtis et al. (2004)	52	COPE	AIMS[a] & PANAS	—	—	.418	[.16, .62]
Curtis et al. (2005)	52	COPE	AIMS[b] & PANAS	−.005	[−.28, .27]	—	
Dobkin et al. (2008)	165	CHIP	CES-D	—	—	.390	[.25, .51]
Evers et al. (2002)	95	UCL	IRGL[a]	−.145	[−.34, .06]	.265	[.07, .44]
Griffin et al. (2001)	56	COPE	PANAS	−.010	[−.27, −.25]	.484	[.25, .66]
Groarke et al. (2005)	75	COPE	AIMS[c]	−.175	[−.39, .05]	.400	[.19, .58]
Keefe et al. (1989)	223	CSQ[b]	CES-D	—	—	.620	[.53, .70]
Lowe et al. (2008)	127	MCMQ	HADS	.226	[.05, −.39]	.251	[.08, .41]
Smith and Wallston (1992)	239	VPMI	CES-D	—	—	.330	[.21, .44]
Treharne et al. (2007)	154	CSS	HADS	.005	[−.15, .16]	—	—
van Lankveld et al. (2000)	109	CORS	IRGL	−.290	[−.45, −.11]	−.116	[−.30, .07]
Ziarko et al. (2014)	210	Brief-COPE	CES-D	—	—	.400	[.28, .51]
Ziarko et al. (2019)	85	CSQ	HADS	−.257	[−.44, −.04]	.062	[−.15, .27]
			Overall effect size	−.155	[−.31, .01]	.347	[.23, .46]
				$k = 10$		$k = 12$	

Note: BDI (Beck Depression Inventory; Beck et al., 1961), BAI (Beck Anxiety Inventory; Beck et al., 1988), HADS (Hospital Anxiety and Depression Scale; Zigmond & Snaith, 1983), CES-D (Centre for Epidemiologic Studies – Depression Scale; Radloff, 1977), AIMS (Arthritis Impact Measurement Scale; Meenan et al., 1982), IRGL (Invloed van Reuma op Gezondheid en Leefwijze (Dutch health status questionnaire derived from AIMS); Huiskes et al., 1990), PANAS (Positive And Negative Affect Scale; Watson et al., 1988), CSQ (Coping Strategies Questionnaire; Rosenstiel & Keefe, 1983), COPE (Coping Orientation to Problems Experience; Carver et al., 1989), UCL (Ultrecht Coping List; Schreurs et al., 1993), CSE (Coping Self-Efficacy scale; Chesney et al., 2006), CHIP (Coping with Health Injuries and Problems scale; Endler et al., 1998), MCMQ (Medical Coping Modes Questionnaire; Feifel et al., 1987), CSS (Coping Schedule for Stress; Tyler & Cushway, 1995), CORS (Coping with Rheumatoid Stressors; van Lankveld et al., 1994), Brief-COPE (Brief Coping Orientation to Problems Experience; Carver, 1997), VPMI (Vanderbilt Pain Management Inventory; Brown & Nicassio, 1987); CSQ[a] = coping attempts & pain control and rational thinking subscales; CSQ[b] = catastrophising subscale; AIMS[a] = depression and anxiety subscales; AIMS[b] = depression subscale; AIMS[c] depression and anxiety subscales; IRGL[a] = anxiety and depressed mood subscales.

Sensitivity analysis

To examine if the pooled effects were influenced by the inclusion of the study rated as low quality, a sensitivity analysis was conducted. After removing this study (Ziarko et al., 2014) the results remained largely unchanged for maladaptive coping ($k = 11$, $r = .341$, 95% CIs [.21, .46], $p = .000$).

Publication bias

For maladaptive coping, all tests suggested the absence of publication bias. The Egger's Regression test was non-significant, $b_0 = -3.04$, 95% CIs [−9.68, 3.60], $t\,(10) = .95$, $p = .332$. The trim-and-fill test resulted in no studies being trimmed, producing identical obtained and imputed effects ($r = .347$, [.33, .41]). Lastly, the fail-safe *N* method estimated that 614 studies with effects above $p < .05$ would be needed for the pooled effect size to no longer be significant, which is well above the required the $k = 70$ suggested by Rosenthal's (1979) guidelines.

DISCUSSION

To the best of our knowledge, this study is the first meta-analysis investigating the associations between coping and psychological distress in RA, and the factors that influence these associations. Consistent with our hypothesis, maladaptive coping was significantly associated with greater psychological distress across the pool of studies, with an medium-sized overall association. In contrast, adaptive coping styles were not significantly associated with reduced distress as hypothesised. Moderator analyses indicated that the pooled association between maladaptive coping and distress was robust to the influence of age, gender, and illness duration. However, the pooled associations between maladaptive coping and distress were moderated by the distress type, with larger effects found for those studies with effects for depression compared to those that examined mixed types of distress. Contrary to expectations, the hypothesised association between adaptive coping and lower distress did not reach significance across the pool of studies.

Overall, the findings from the meta-analysis of maladaptive coping and distress are consistent with both theory and previous research. From a transactional view of coping (Lazarus & Folkman, 1984) using coping strategies that involve turning the focus of attention away from the stressor can lead to psychological distress, due in part to the temporary impact of these strategies for managing the stressor (Abramson et al., 1978; Stanton et al., 2000). In the context of RA, not attending to pain, psychosocial stressors, and other disease-related stressors means that they will persist, increasing distress, and exacerbating symptoms. Similarly, preservative styles of coping that promote pre-occupation with disease-related stressors without finding ways to address them can amplify and prolong the stress response and its effects on health (Smyth et al., 2013). Vriezekolk et al. (2011) also found that maladaptive coping was linked to higher distress in their qualitative systematic review which included studies with and without covariates, and with coping defined more broadly than in this review. This study extends these findings by quantifying this association, and also by formally testing possible factors that may influence the coping-distress association.

Although adaptive coping was significantly associated with lower psychological distress in the majority of the studies analysed, the overall pooled effect was not significant. This contrasts with the previous review which used a vote counting approach to synthesizing the research on coping and distress in RA (Vriezekolk et al., 2011), and therefore did not consider the influence of effect size or sample size, as in this meta-analysis. Our findings are consistent though with Geisser et al.'s (1999) *model of adjustment to chronic pain* which provides a plausible explanation for these null findings. This model posits that maladaptive coping and pain beliefs are the strongest determinants of psychological distress and may even impair the benefits of adaptive coping. Accordingly, maladaptive coping contributes to greater feelings of helplessness about pain control, which in turn can make it more difficult to use adaptive coping strategies and reap their benefits. Other research suggests that maladaptive coping may have more relevance for distress-related outcomes, whereas adaptive coping has the most relevance for pain severity (Tan et al., 2011). These propositions are also consistent with research indicating that the associations between maladaptive coping and depression are stronger than those between adaptive coping and depression in chronic pain samples (Snow-Turek et al., 1996; Tan et al., 2011). Our findings therefore suggest that interventions aimed at identifying and targeting maladaptive coping may be of greater benefit for reducing distress in people with RA, than efforts solely focused on enhancing adaptive coping skills.

Despite previous research finding that disease duration, gender, and age can strengthen or attenuate the link between coping and stress, moderator analyses for maladaptive coping were not significant for these variables. It is possible that the high percentages of females in the samples in this meta-analysis (all > 64%) made it difficult to detect any effect of gender. Our findings regarding disease duration and age echo those from a meta-analysis by Duangdao and Roesch (2008), who similarly found that time since diagnosis and age did not moderate the links between maladaptive (i.e., avoidant) coping and indices of adjustment, including distress, in people with diabetes. However, given the relatively small pool of studies involved in these analyses, our findings should be viewed with caution.

This meta-analysis provides further support for the importance of taking a biopsychosocial approach to managing RA (Keefe et al., 2002; National Institute for Health and Care Excellence, 2018), and the implications of doing so for practice. Given our findings, and Geisser et al.'s (1999) proposal that maladaptive coping may impair the benefits of adaptive coping, coping interventions that focus on reducing the use of maladaptive coping may be particularly beneficial for reducing psychological distress in people with RA. Cognitive behavioural therapy (CBT), one of the most researched psychological interventions for RA, typically involves coping skills training. The primary aim of this training is to identify maladaptive coping strategies that are engaged in alongside encouraging problem-solving techniques (adaptive coping) to increase coping self-efficacy (Wadsworth, 2015). This involves using cognitive restructuring techniques to understand the maladaptive cognitions that lead to the use of maladaptive strategies, and reformulating these thoughts into alternative, adaptive ones (Wadsworth, 2015). Reviews of psychological interventions for RA report that these interventions can improve coping skills in patients with RA, with improvements remaining significant at the follow-up (averaging eight and a half months; Astin et al., 2002).

Strengths and limitations

These findings should be considered in the context of several limitations and strengths. With respect to the evidence base, there were a limited number of studies that met the inclusion criteria, resulting in smaller pools of studies for each of the two meta-analyses. Although the minimum number of subgroups for the categorical moderation analysis and the minimum sample size for meta-regressions were just met, the power for conducting these analyses may have been restricted (Card, 2012). The limited number of studies also meant that it was not possible to fully examine whether the effects varied across all types of distress as there were only sufficient studies to compare depression to combined measures of distress. Together these issues suggest that the moderation findings could be considered preliminary and require further replication once the evidence base grows.

These findings were also based primarily on effects derived from cross-sectional studies, limiting the conclusions that can be drawn regarding the direction of causality between coping and distress. It could be argued that experiencing psychological distress drives the choice of coping strategies in people with RA, with higher levels of distress due to pain and psychosocial issues prompting the use of avoidant and other forms of maladaptive coping as a means of managing mood. Nonetheless, the proposition that maladaptive coping results in further distress is consistent with both transactional coping theory (Lazarus & Folkman, 1984), and findings from a previous review of the longitudinal associations of coping with distress in RA (Vriezekolk et al., 2011), which together suggest that the choice of coping strategy precedes distress rather than the reverse. However, it is also likely though that maladaptive coping and distress are reciprocally linked in mutually reinforcing and dynamic ways that require more sophisticated research designs to unravel.

Caution should also be taken in generalizing the results of these meta-analyses to the wider RA population. Because most studies ($k = 14$) recruited participants from rheumatology outpatient services or registries, it could be argued that many of the studies were vulnerable to selectivity bias, in which only those well enough to attend an outpatient clinic were included. Whilst the sampling methods employed by all studies ensured participants had a diagnosis of RA, it is likely these methods excluded individuals who were not actively or regularly accessing their outpatient services because they may have been too unwell to do so. These findings may therefore be more relevant to those with better physical and psychological health.

There are several strengths of this study which balance these limitations. The studies analysed examined a variety of different coping strategies, increasing the generalisability of the findings. In addition, the majority of these coping strategies mapped well onto the coping conceptual framework used, which took a more nuanced view of emotional coping by viewing emotional strategies as being either adaptive or maladaptive, rather than always problematic (Austenfeld & Stanton, 2004). Nonetheless the majority

of the emotional coping strategies in the studies analysed fell into the maladaptive category, suggesting that further research is needed to understand how other adaptive coping strategies are linked to distress in RA.

Despite the relatively small size of the pools of studies analysed, we propose that conducting these meta-analyses is nonetheless valuable. Cumming (2014) recommends that small-scale meta-analyses play an important role in helping to build cumulative quantitative research on a topic that may be understudied and for which there are important implications for both policy and practice. As this is the first meta-analysis of the links between coping and psychological distress in RA that we are aware of, the findings make an important contribution to understanding the nature of the differential linkages of adaptive and maladaptive coping with psychological distress, and the factors that influence these associations. As noted previously, this knowledge can help inform ways to manage distress in RA, as well guide the choice of targets for interventions aimed at changing coping strategies to help reduce the burden of distress on physical symptoms, and further distress (e.g., Sharpe et al., 2001).

CONCLUSION

For individuals with RA, the coping styles that are employed in attempts to tolerate or manage the chronic or acute everyday stressors associated with the disease are important for psychological well-being. These meta-analyses found that maladaptive coping is associated with increased psychological distress, whereas adaptive coping was not significantly associated with lower distress. These findings suggest that psychological interventions for this population should focus on approaches such as cognitive restructuring to reduce maladaptive coping and any associated distress. Further research is needed to grow the evidence base on coping and distress in RA to verify these findings especially with respect to understanding the role of adaptive coping in psychological distress.

AUTHOR CONTRIBUTIONS

Rebecca Hinch: Writing – original draft; formal analysis; data curation; conceptualization; investigation; project administration; methodology; writing – review and editing. **Fuschia M. Sirois:** Conceptualization; writing – review and editing; supervision; resources; methodology; formal analysis.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

As this study is a meta-analysis of published studies, all data analysed is already available in the manuscript and/or the original studies.

ORCID

Fuschia M. Sirois https://orcid.org/0000-0002-0927-277X

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