

1 **Title:**

2 Improving Motivation to Change Amongst Individuals With Eating Disorders: A
3 Systematic Review

4

5 **Running Title:**

6 Systematic Review of Motivation to Change

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20

1 **Abstract:**

2 **Objective:** People with eating disorders can have low motivation to change their eating
3 disorder behaviors. Interventions aiming to enhance motivation to change have been
4 increasingly advocated in their treatment. Questions remain regarding the strength of
5 the evidence supporting the effectiveness of interventions that specifically focus on
6 improving motivation. This review explored the evidence for improving motivation to
7 change in eating disorders via clinical interventions. **Methods:** Searches of the published
8 and unpublished literature were conducted by searching databases (PubMed, PsychInfo,
9 Web of Science) and trial registries (WHO ICTRP), and by contacting authors. Studies
10 were included if they investigated an intervention for eating disorder patients, included
11 a pre-post outcome measure of motivation to change and were published in English.
12 Risk of bias was also assessed. **Results:** Forty-two studies were included in the final
13 review. Evidence was found to support the use of interventions to improve motivation
14 to change, though it was unclear whether motivational interventions present a more
15 effective option than approaches that do not exclusively or specifically focus on
16 motivation. However, motivational interventions were identified as being more effective
17 than low intensity treatments. Risk of bias in included studies was generally high.
18 **Discussion:** Motivation was found to increase across treatments in general, whether or
19 not the focus of the intervention was on enhancing motivation. It is unclear if
20 interventions specifically targeting motivation to change provide additional benefit over
21 and above established treatment approaches.

22

1 **Keywords:**

2 Feeding and Eating Disorders, Review, Motivation, Motivational Interviewing, Early

3 Medical Intervention

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1 **Main Text:**

2 **Introduction**

3 People with eating disorders (i.e. anorexia nervosa and bulimia nervosa) are often
4 considered to have low motivation to change eating disorder behaviors (Colton &
5 Pistrang, 2004; Leavey, Vallianatou, Johnson-Sabine, Rae & Gunpath, 2011). One
6 possible reason for this low motivation to change may be a sense of denial regarding
7 whether behaviors are problematic or require intervention (Gulliksen et al., 2015;
8 Reyes-Rodríguez et al., 2013). Indeed, the core features of eating disorders can often be
9 highly valued and perceived as functional, as the behaviors may provide a focus, coping
10 mechanism or sense of control (Schmidt & Treasure, 2006; Schoen et al., 2010; Williams
11 & Reid, 2010). Furthermore, even if a person does recognize the negative effects of their
12 behaviors, the perceived functional role of the eating disorder can cause them to feel
13 highly ambivalent about change (Cockell, Gellen & Linde, 2003; Serpell, Treasure,
14 Teasdale & Sullivan, 1999; Williams & Reid, 2010). Thus, people with eating disorders
15 can become fixed in their behaviors and experience low confidence and fears about
16 change and therefore have low motivation to do so (Leavey et al., 2011). As a result,
17 poor engagement in treatment and high drop-out rates are common in eating disorders
18 care (Waller et al., 2009; Ali et al., 2016; Hart et al., 2013), and people with an eating
19 disorder often delay treatment by an average of 10-15 years (Oakley, Browne, Wells &
20 Mcgee, 2006).

1 Low motivation to change has been associated with more severe eating disorder
2 symptoms and body dissatisfaction (Geller et al., 2008; Zaitsoff & Taylor, 2009), whilst
3 higher levels of pre-treatment motivation to change are associated with increased
4 positive treatment outcomes relating to restrictive eating behaviors, bingeing behaviors,
5 and cognitive/affective measures of eating disorder pathology (Clausen, Lubeck & Jones,
6 2013; Treasure et al., 1999). Enhancing motivation to change can therefore be
7 considered essential in the treatment of eating disorders, regardless of the approach
8 taken (NICE, 2017; Treasure & Schmidt, 2001).

9 The most common form of motivational intervention is Motivational Interviewing (MI),
10 which has been defined as a client-centered yet directive approach for enhancing
11 intrinsic motivation to change by exploring and resolving client ambivalence (Miller &
12 Rollnick, 2002). The concepts behind MI have also resulted in a number of Adapted
13 Motivational Interviewing interventions (AMIs)(Rollnick, Heather, & Bell, 1992; Burke,
14 Arkowitz & Menchola, 2003), such as Motivational Enhancement Therapy (MET)(Miller,
15 Zweben, DiClemente, & Rychtarik, 1992; Project MATCH, 1997).

16 The use of motivational interventions in the treatment of eating disorders has found
17 support in recent years. Macdonald, Hibbs, Cofield and Treasure (2012) examined the
18 effectiveness of interventions that include the principles and techniques of MI and its
19 adaptations in the treatment of eating disorders. This systematic review found
20 promising results for interventions that included motivational interviewing, particularly
21 with regards to their use in increasing readiness and motivation to change. Similarly,

1 Bonder and Mantler's (2015) review of interventions using both specific and adapted MI
2 approaches reports significant increases in readiness to change in 70% of the 10 studies
3 reviewed. Bonder and Mantler note, however, that only half of these studies found
4 improvements solely in the treatment group.

5 However, despite the increase in the use of these motivational interventions, this
6 approach has recently come under criticism. Knowles, Anokhina and Serpell (2013)
7 reviewed seven studies that aimed to determine whether interventions specifically
8 designed to enhance motivation to change in people with eating disorders were
9 effective. Improvements were made when motivational interventions were compared
10 with lower intensity treatments (e.g. self-help) or with non-clinical populations, but not
11 in clinical samples or in comparison to established treatments (e.g. Cognitive-Behavioral
12 Therapy (CBT)). The review also found that motivational interventions appeared to be
13 effective at improving binge eating behaviors, but not compensatory and restrictive
14 behaviors. As such, Knowles et al. (2013) concluded that the evidence base did not
15 support the widespread dissemination of motivation-enhancing interventions in the
16 treatment of eating disorders. Similarly, Waller (2012) criticized the lack of evidence to
17 support motivational interventions.

18 Current evidence for the effect of motivation-focused therapies (MI, MET, AMIs) in
19 improving motivation to change is therefore mixed. This is potentially a result of a lack
20 of homogeneity in terms of the study designs, samples and measures used in these
21 studies. It is also of note that risk of bias was not systematically addressed in any of the

1 previous reviews, making it hard to assess the quality of evidence. Additionally it is
2 difficult to assess the effectiveness of specifically motivational interventions in
3 comparison to other approaches without framing this question within the context of
4 increasing motivation to change in treatment as a whole. This becomes particularly
5 problematic as it can be difficult to draw out the effect of motivational-focused aspects
6 when these therapies are combined with other approaches such as CBT.

7 Questions remain as to how effective specific motivation-focused therapies are at
8 improving motivation to change in relation to other therapies. Thus, this systematic
9 review aims to address this uncertainty by taking a broader approach than previous
10 systematic reviews to answer the following research questions:

11 1) What evidence is there that treatment interventions increase motivation to change
12 amongst individuals with eating disorders?

13 2) Are specifically motivationally focused interventions more effective than established
14 treatments at increasing motivation to change?

15

16 **Methods**

17 Searches of the published literature were conducted across all available date ranges on
18 PubMed, PsychInfo and Web of Science for all combinations of the following two sets of
19 terms, in any search field; "eating disorder", "anorexia", "bulimia", "EDNOS", "eating
20 disorder not otherwise specified", "anorexia nervosa", "bulimia nervosa", "binge

1 eating", "disordered eating", "OSFED" and "otherwise specified feeding or eating
2 disorder"
3 AND "motivation", "motivational", "motivational intervention", "motivational
4 enhancement", "motivational assessment", "motivational interviewing", "behaviour
5 change counseling", "intention to change", "stages of change", "readiness to change",
6 "self determination theory" and "transtheoretical model".

7 Thus, 108 separate searches were conducted in each online repository, with resulting
8 papers screened against the following inclusion criteria: participants met, or partially
9 met diagnostic criteria for an eating disorder; the research investigated an intervention
10 that was intended for eating disorder patients (i.e. not intended for caregivers); the
11 study included a pre-post test of motivation to change; and was reported in a published
12 article that was available in the English language. We limited our inclusion criteria to
13 articles published in English, because we estimated the majority of relevant work to
14 have been undertaken in Europe or the US. When exploring the second research
15 question the following additional selection criteria were used to identify relevant
16 studies from those included in the review: compared a specific motivationally focused
17 intervention to an active or treatment as usual (TAU) control group; included a pre-post
18 test of motivation to change for both groups.

19 The references lists of these papers and recent reviews in this area were also hand
20 searched for additional papers, with no additional papers identified. The screening and

1 review of published papers was conducted independently by both JD and SM ($K = 0.96$)
2 and any issues were discussed and resolved by consensus.

3

4 Identification of unpublished literature was carried by contacting corresponding authors
5 of all included papers, as well as a search conducted in the World Health Organisation's
6 International Clinical Trials Registry Platform (ICTRP) using the same method outlined
7 above. Where potential trials of interest were identified researchers were contacted to
8 enquire about available data. The screening and review of unpublished material was
9 conducted independently by only JD, due to the required reliance on authors.

10 Data was extracted from included studies using Excel forms to record: sample size,
11 gender, age and eating disorders; the number of completers; study characteristics,
12 including design, treatment and control conditions; motivational measures used and
13 assessment times; motivational outcomes and, where available, effect sizes (where
14 multiple assessment times were examined effect sizes are reported from the first to last
15 assessment). Where effect sizes were not available in the published paper
16 corresponding authors were contacted to enquire if the information was available. If not
17 effect sizes were calculated by the authors where the necessary data was available.

18 Individual write-ups of each study were produced to summarize findings and highlight
19 any methodological shortcomings. Data extraction was carried out by JD and confirmed
20 by SM or KA with no disagreements.

1 The primary outcome investigated was motivation to change between pre- and post
2 intervention. A narrative synthesis approach was adopted to analyze the extracted data
3 due to the heterogeneity between included studies. Due to the small number of studies
4 available and the variety of differences between studies, no statistical analysis was
5 conducted.

6 Risk of bias for all included studies was assessed on three domains derived from the Risk
7 of Bias in Non-Randomized Studies (ROBINS-I) tool (Sterne et al., 2016).

8 Bias in classification of interventions: a judgment of high (low) risk of bias was given if
9 the study intervention(s) type, setting, dose/frequency, intensity and/or timing of
10 intervention was not (was) adequately defined to allow for replication, or if (no) major
11 aspects of the assignments of intervention status were determined in a way that could
12 have been affected by knowledge of the outcome.

13 Bias due to deviations from intended interventions: a judgment of high (low) risk of bias
14 was given if any (no) deviations from the intended intervention(s) were reported that
15 were likely to have affected the outcome.

16 Bias due to missing data: a judgment of high risk of bias was given if the outcome data
17 for the study was not (was) available for all, or nearly all (greater than 90% data),
18 participants and (or) missing data was not (was) suitably accounted for in the analyses.
19 This bias was assessed in relation to its impact on reported motivational outcomes.

1 In addition to this, studies that utilized a randomized control trial design were assessed
2 for risk of bias on the following two domains derived from the Cochrane Collaboration's
3 tool for assessing risk of bias in randomized trials (Higgins et al., 2011):

4 Selection Bias: a judgment of high (low) risk of bias was given if a non-random (random)
5 approach to sequence generation was reported or (and) if participants or investigators
6 enrolling participants could (not) possibly foresee assignments and thus introduce
7 selection bias.

8 Performance Bias: a judgment of high (low) risk of bias was given if participants and
9 personnel were (not) aware of which intervention a participant received and (or) the
10 outcome could (not) have been influenced by this lack of blinding.

11 For each domain, if insufficient information was provided to make a clear judgment the
12 domain was marked as having an unclear risk of bias.

13

14 **Results**

15

16 **Figure 1: PRISMA flow diagram of systematic review.**

17 Original searches of the published literature were conducted between the 9th and 22nd
18 of February 2016, and updated in August 2017 during the write up of the paper.

19 Searches for unpublished literature were conducted from May – July 2018. Details of the
20 outcomes of the search and screening processes are given in the PRISMA diagram.

1 42 studies (3241 participants) are included in the review, 41 of which were published in
2 peer reviewed journals, one was unpublished. Participants varied in terms of diagnoses,
3 where 19 studies included patients with a range of eating disorders, 15 focused on
4 anorexia nervosa only, 2 focused on bulimia nervosa only, 2 focused on binge eating
5 disorder only and 4 did not clearly state the eating disorder of participants in the study.
6 Participants were recruited from different locations, including inpatient, outpatient,
7 community and university settings.

8 The selected studies investigated a broad range of interventions, including MI, CBT,
9 cognitive remediation therapy, MET, psycho-education and residential treatment
10 programmes.

11 Studies also varied according to length of follow-up, with 26 studies only making post
12 comparisons immediately after the intervention, five included follow ups which did not
13 examine motivation, whilst the remaining 11 included follow ups that addressed
14 motivation varying from six weeks to two years. Table 1 includes full details of all
15 included studies.

16

17 **Table 1: Characteristics of included studies**

18

19 Risk of bias across the identified studies was high. Whilst bias due to deviations from
20 intended interventions was judged to be low across all studies, a number of studies
21 failed to adequately describe the full nature of the intervention being investigated

1 (Wade et al., 2009; Bustin et al., 2013; Dean et al., 2008; Rodríguez-Cano & Beato-
2 Fernández, 2005; Thaler et al., 2016). Many studies were given a judgment of high risk
3 of bias from the handling of missing data, with 19 studies reporting dropout rates of
4 greater than 10% but failing to account for this in their analysis, therefore potentially
5 inflating the impact of the intervention. In the risk of bias for domains relating to
6 randomized control trials only Vella-Zarb et al.(2014) and Weiss et al. (2013) were
7 judged at high risk of performance bias. None of the included studies were judged to
8 have a high risk of selection bias. Some studies did not provide enough information to
9 make a clear judgment, as can be seen in table 2.

10

11 **Table 2: Risk of bias for included studies**

12

13 **Research Question 1 - What evidence is there that treatment interventions increase**
14 **motivation amongst eating disorder populations?**

15 Thirty-one of the 42 studies reported significant improvements in motivation to change
16 due to treatment. Successful interventions included commonly used treatment
17 approaches such as multi-disciplinary treatment programs, CBT, CRT and motivational
18 approaches such as AMIs and MET. More novel interventions also showed promise at
19 improving motivation to change, including digital health approaches such as web-based
20 delivery, the use of virtual reality and text messaging. Risk of bias was generally high,
21 with only 13 studies being judged to have a low risk of bias across all domains (Cassin et
22 al., 2008; Geller et al., 2011; Hötzel et al., 2014; Touyz et al., 2013; Wade et al.,

1 2009; Allen et al., 2011; George et al., 2007; Gowers & Smyth, 2004; Hillen et al,
2 2015; McHugh, 2007; Tchanturia, Larson & Brown, 2016; Lueng, Ma & Russell, 2013;
3 Kuge et al., 2017).

4 The positive impact of treatment on motivation to change appears to have a long term
5 effect, with nine of the eleven studies that included a follow-up measure of motivation
6 finding that improvements were maintained, or continued to increase, across all time
7 points up to two years (Dean et al., 2008; Geller et al., 2011; Leung, Ma & Russell,
8 2013a; Lueng, Ma & Russell, 2013b; Rodríguez-Cano & Beato-Fernández,
9 2005; Rodríguez-Cano et al., 2012; Touyz et al., 2013; Wade, Treasure & Schmidt, 2011,
10 Pellizzer, unpublished). Only one study, Ackard et al. (2014), found that motivation to
11 change dropped below baseline over time.

12 Four of the total 42 studies (Thaler et al., 2016; Thaler et al., 2014; Ackard et al., 2014;
13 Dingemans et al., 2013) found no improvements on any measure of motivation to
14 change. The studies examined diverse treatment programs with no focus on a particular
15 intervention, making it difficult to assess whether it was individual or combined
16 elements of the treatment program that failed to improve motivation to change. Of
17 these studies only Thaler et al. (2014) and Dingemans et al. (2013) were judged to have
18 a low risk of bias across all domains.

19 The remaining seven of the 42 studies reported either mixed findings or trends towards
20 significance, of which only two had a low risk of bias across all domains (Wade et al.,
21 2009; Shingleton et al., 2016). Of these seven studies, three found non-significant

1 improvements with small effect sizes (Pretorius et al., 2012; Tchanturia, Doris &
2 Fleming, 2014; Lloyd et al., 2014). Dean et al. (2008) did not report effect sizes but
3 found a non-significant increase in motivation in both groups from pre- to post-
4 treatment, with subsequent non-significant increases for the treatment group and
5 decreases in the control group from post-treatment to follow-up. Tchanturia, Larsson
6 and Adamson (2016) found significant improvements in ability to, though not
7 importance of, change amongst individuals with low autism scale scores but no effects
8 for those with high scores. Wade et al. (2009) found improvements in motivation to
9 change relating to the importance to recover and importance to eat normally and gain
10 weight for both the active and control conditions at week two, but these measures
11 dropped to just below baseline by week six for both groups. Shingleton et al. (2016)
12 similarly found that when exposed to a motivational text message intervention, pre-
13 contemplation scores for participants decreased and action and confidence subscale
14 scores increased significantly. However, pre-contemplation scores were found to
15 decrease less during periods when participants were receiving the text messages,
16 though conversely action scores increased more during this period.

17 When looking at the seventeen studies deemed to have the lowest risk of bias, the
18 pattern of findings is similar to that of the rest of the literature, with 13 of the 17 studies
19 finding evidence to support the effectiveness of treatment to improve motivation to
20 change (Cassin et al., 2008; Geller et al., 2011; Hötzel et al., 2014; Touyz et al.,
21 2013; Wade et al., 2009; Allen et al., 2011; George et al., 2007; Gowers & Smyth,
22 2004; Hillen et al, 2015; McHugh, 2007; Tchanturia, Larson & Brown, 2016; Lueng, Ma &

1 Russell, 2013; Kuge et al., 2017). Of the remaining four Wade et al. (2009) and
2 Shingleton et al. (2016), as noted previously, presented mixed findings whilst Thaler et
3 al. (2014) and Dingemans et al. (2013) found no significant improvements in motivation
4 to change.

5 Potential differences in the effect of interventions on motivation to change between
6 different eating disorder diagnoses is difficult to ascertain as only two studies provided
7 sub-group analysis for motivational changes based on eating disorder type (Allen et al.,
8 2001; Rodríguez-Cano et al., 2012). However in both cases, whilst significant changes in
9 motivation to change were found for all participants, the pattern of change was
10 different between sub-groups. Allen et al. (2001) found reductions in pre-contemplation
11 in both people with anorexia nervosa and bulimia nervosa, though this was only
12 significant for those with anorexia nervosa. Whilst increases in action ratings to change
13 dietary restraint and increases in internal (self - driven) motivation to change were
14 significant in the bulimia nervosa group, these were not observed for those with
15 anorexia nervosa symptoms. Similarly Rodríguez-Cano et al. (2012) found that more
16 improvement in the action and maintenance stages of the Transtheoretical Model
17 (TTM), and subsequently significantly greater decreases in the relapse stage, were found
18 in individuals with bulimia nervosa non-purging type and EDNOS .

19 A wide range of validated measures were used to assess motivation to change, however
20 13 of the 42 studies relied solely on unvalidated likert scale measures, commonly
21 referred to as 'Motivational Rulers' (Cassin et al., 2008; Dingemans et al., 2013; Genders

1 & Tchanturia, 2010; Gowers & Smyth, 2004; Kuge et al., 2017; Lloyd et al., 2014;
2 Pretorius et al., 2012; Tchanturia, Doris & Fleming, 2014; Tchanturia, Larsson &
3 Adamson, 2016; Tchanturia, Larson & Brown, 2016; Tchanturia et al., 2015; Weiss et al.,
4 2013; Pellizzer, unpublished). Looking at the remaining 29 studies the distribution of
5 evidence remained largely the same, with 23 studies reporting significant improvements
6 in motivation to change due to treatment, three studies finding no improvements and
7 the final three studies reporting either mixed findings or trends towards significance.

8 Studies included in this review examined a wide range of interventions including
9 specifically motivational approaches such as AMIs and MET, as well as commonly used
10 treatment approaches such as multi-disciplinary treatment programs, CBT, Readiness
11 and Motivation Therapy (RMT), Maudsley Model for Treatment of Adults with AN
12 (MANTRA), Cognitive Remediation Therapy (CRT), Cognitive Remediation and Emotion
13 Skills Training (CREST) and Multi-Family Therapy (MFT). It is worth noting that many of
14 the included interventions, even when not specifically motivational in nature, include
15 motivational elements as part of their approach. For example both CBT and MANTRA
16 contain motivational components, and many multi-disciplinary treatment programs
17 include motivational interventions.

18 These findings provide clear evidence to support the effectiveness of a wide range of
19 treatments at improving motivation to change in individuals with eating disorders.

20

1 Research question 2 - Are motivationally focused interventions more effective than
2 standard treatment at increasing motivation?

3 Six studies (457 participants) in the review compared a specific motivationally focused
4 intervention to an active or treatment as usual (TAU) control group and also included a
5 motivational measure for both groups (Cassin et al., 2008; Dean et al., 2008; Dunn et al.,
6 2006; Treasure et al., 1999; Vella-Zarb et al., 2014; Wade et al., 2009). Three studies
7 reported significantly greater improvements in motivation for the active condition in
8 comparison to the control (Cassin et al., 2008; Dunn et al., 2006; Vella-Zarb et al., 2014).
9 Each of these studies used a brief single-session motivation treatment compared to a
10 low intensity control group such as self-help or psycho-education. In contrast, all three
11 studies that compared a more intensive motivational element (e.g. over 4 weeks) with
12 established TAU such as CBT found no significant difference between both groups (Dean
13 et al., 2008; Treasure et al., 1999; Wade et al., 2009). It is worth noting that in each of
14 these studies the control intervention may have included some motivational elements.
15 Both Treasure et al. (1999) and Dean et al. (2008) used CBT as part of the control, which
16 addresses the function of the ED and may involve examining the pros and cons of
17 change, which are components of motivational interventions, whilst the TAU approach
18 utilised in Wade et al.'s (2009) study included a two week programme that was intended
19 to support patients in contemplating change. Whilst no study reported any significant
20 differences in baseline motivational measures between groups, Wade et al. (2009) did
21 observe that when categorised into high or low readiness to change significantly more
22 participants in the TAU condition were in a high state of readiness.

1 The overall risk of bias for these studies is high. Most studies, other than those by Cassin
2 et al. (2008) and Dunn et al. (2006), suffer from low numbers, either as a result of low
3 recruitment or high rates of attrition. Studies had issues of potential cross-
4 contamination of treatments (Treasure et al., 1999) or did not control for differences in
5 contact time between treatment arms (Cassin et al., 2008). Only two studies were
6 ascribed a low risk of bias across all domains (Cassin et al., 2008; Wade et al., 2009). Of
7 these Cassin et al. (2008) reported improved motivation to change for the motivational
8 intervention compared to self-help but Wade et al. (2009) found no improvements over
9 treatment as usual. However the majority of papers used validated measures of
10 motivation to change, with only Cassin et al. (2008) relying solely on an unvalidated
11 likert scale measure.

12 The evidence here, therefore, is less clear than for the primary research question, with
13 only half the studies reporting that interventions targeted at improving motivation were
14 more effective at improving motivation than a self-help or psycho-education control
15 group, compared to studies comparing higher intensity motivational elements to
16 established treatments such as CBT. However, where research did not find specifically
17 motivational interventions to be more effective than established treatments these
18 interventions were still shown to be comparable.

19

20 **Discussion**

1 The results of this systematic review provide support for the use of a range of treatment
2 approaches to improve motivation to change amongst eating disorders patients, with
3 suggestions that these positive effects are sustained beyond treatment. Given that lack
4 of engagement with interventions is an issue in the treatment of eating disorders, this
5 ability to improve motivation to change can be vital in ensuring effective clinical
6 outcomes (Waller et al., 2009; Ali et al., 2016; Hart et al., 2013).

7 The results of this review support previous work by Knowles et al. (2013) suggesting that
8 approaches targeted at motivation may be more effective at increasing motivation to
9 change over approaches such as self-help or psycho-education, but are no more
10 effective than interventions such as CBT. The comparison of approaches targeted at
11 motivation specifically with interventions that don't is complicated by the fact that
12 many approaches, such as CBT, MANTRA or multi-disciplinary care programs,
13 incorporate motivational elements. This is further complicated given that in each of the
14 studies examined motivational interventions were delivered either alongside or in
15 preparation for non-specifically motivational treatments, and is made particularly
16 difficult in two studies (Dean et al., 2008; Vella-Zarb et al., 2014) that did not fully report
17 the nature of treatment delivered in each condition.

18 As the evidence presented demonstrates that a range of interventions are effective at
19 improving motivation to change, and given that many of these approaches include
20 motivational elements, the low impact of approaches targeted at motivation on
21 motivational outcomes does not necessarily demonstrate a lack of effectiveness.

1 Indeed, when used as brief, single session interventions in comparison to clearly non-
2 motivational approaches such as self-help or psycho-education, benefits are seen.
3 However the addition of specifically motivational interventions appears unnecessary
4 when combined with approaches that may already integrate motivational approaches.
5 Given that an individual's initial stage of change is related to improvement with therapy
6 (Franko, 1997; Treasure et al., 1999), the use of brief motivational interventions early in
7 the treatment process to promote motivation to change and facilitate further treatment
8 remains a valid approach.

9 Any conclusions are limited by the high risk of bias present in the included studies. This
10 is likely a result of the broad nature of this review, which, whilst done to give a
11 representative view of the literature base, resulted in some limitations. By not limiting
12 the studies included in the review the studies presented were highly heterogeneous,
13 including a wide variety of research designs, interventions, and outcome measures. The
14 wide variety of motivational measures used by studies ranged between validated
15 itemized scales, examination of stages of change and single item Likert scales, making
16 direct comparisons and synthesis of the information difficult and limiting the strength of
17 conclusions that could be drawn. This lack of consistency, as well as the lack of
18 consensus as to the best approach to measure motivation to change, is a distinct
19 limitation of the current literature in this area that future research might seek to
20 address. The inability to draw meaningful conclusions regarding the impact of
21 interventions on differing ED diagnosis due to the lack of research in this area presents a
22 further limitation of the findings. The review itself is also limited by our decisions to

1 restrict the review of the published literature to articles published in English, so a
2 potential selection bias is present, but as the majority of work is likely to have been
3 undertaken in Europe or the US, we estimate this risk of bias to be very low.

4 The current literature base could be significantly improved by conducting suitably
5 powered, more methodologically robust research into the effectiveness of motivational
6 interventions. In particular, more research is needed into the relative strengths and
7 weaknesses of this approach in comparison to currently available treatment options.
8 We suggest that such studies use credible, time-matched comparison treatments,
9 report proper description of these treatments, include sufficient blinding and fidelity
10 checks, and use established, comparable measures of motivation to change. Further to
11 this, more research is required providing a deeper analysis of the impact of motivation
12 to change on individuals with different eating disorder diagnoses.

13 In conclusion, this review presents strong evidence that motivation to change increases
14 due to treatment. Whilst the evidence remains inconclusive in regards to the
15 effectiveness of approaches targeted at motivation over and above established
16 interventions such as CBT, the use of brief, single session motivational interventions do
17 appear to provide benefits over other low intensity approaches such as self-help or
18 psycho-education. However their use in treatment needs to be carefully considered in
19 relation to other available options.

20

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1 **Tables:**

2 Table 1: Characteristics of included studies

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4 Table 2: Risk of bias for included studies

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7 **Figures:**

8 Figure 1: PRISMA flow diagram of systematic review.

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