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Eating-specific interpersonal difficulties: changes and impacts on outcomes during ten-session cognitive behavioural therapy for eating disorders (CBT-T)

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Author Contributions Statement

Initial conceptualisation, investigation, methodology was performed by P.M., D.E-H, M.A., B.R., G.W.

Resources were provided by P.M., D.E-H., K.T. & B.R.

D.E-H. was involved in data curation.

Formal data analysis and results interpretation were performed by M.A., P.M., D.E-H., and K.T.

M.A., D.E-H., K.T. and P.M were involved in the project administration, validation, visualisation, preparation, writing, and subsequent revisions to the original written draft.

Supervision was provided by P.M. and K.T.

All authors provided critical revisions as part of review and editing and approved the final manuscript for submission.

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Keywords: Interpersonal Difficulties; Interpersonal Problems; Eating Disorders; Assessment;

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Public Significance Statement

- Ten-session cognitive behaviour therapy (CBT-T) was associated with very large effect sizes on eating disorder symptoms, psychosocial impairment, and eating disorder-specific interpersonal problems.
- Severity of eating disorder-specific interpersonal problems before treatment did not impact on the rate of improvement during CBT-T.
- Patients with more severe eating disorder-specific eating disorder problems started and ended treatment with more severe eating disorder symptoms and psychosocial impairment, so adjunctive relational interventions may enhance outcomes.

Abstract

Objective: The relationship between interpersonal difficulties and eating disorder symptoms is well-established. The Interpersonal Relationships in Eating Disorders (IR-ED) is a new measure of eating-specific interpersonal difficulties. This study aims to (1) explore changes in IR-ED scores, eating disorder symptoms, and psychosocial impairment during ten-session cognitive-behavioural therapy for eating disorders (CBT-T), (2) assess whether pre-treatment IR-ED scores moderate the trajectory of change in eating disorder symptoms and psychosocial impairment during CBT-T, and (3) investigate the relationship between changes in the IR-ED and changes in eating disorder symptoms and psychosocial impairment. **Method:** Individuals with eating disorders ($N = 126$, $M_{age} = 26.08$) received CBT-T and completed questionnaires at pre-, mid-, and post-treatment. **Results:** Eating-specific interpersonal difficulties, eating disorder symptoms, and psychosocial impairment reduced during CBT-T. Severity of pre-treatment eating-specific interpersonal difficulties was unrelated to change in eating disorder symptoms or psychosocial impairment, irrespective of diagnosis or body mass index. Changes in interpersonal difficulties were associated with concurrent changes in eating disorder symptoms and psychosocial impairment. Early change in interpersonal difficulties did not predict later change in eating disorder symptoms or psychosocial impairment, and early changes in symptoms or psychosocial impairment did not predict later changes in interpersonal difficulties. **Conclusions:** Eating-specific interpersonal difficulties improve during CBT-T, and individuals benefit from treatment regardless of their pre-treatment interpersonal difficulties. Theoretical and clinical implications are discussed.

Keywords: Interpersonal Difficulties; Interpersonal Problems; Eating Disorders; Assessment; Psychometrics

Eating-specific interpersonal difficulties: changes and impacts on outcomes during ten-session cognitive behavioural therapy for eating disorders (CBT-T)

Interpersonal difficulties are characterised by challenges with navigating and establishing relationships with others (Sullivan, 1953). Research has consistently revealed associations between interpersonal difficulties and negative outcomes, including low self-esteem, intolerance of negative affect, maladaptive coping behaviours, and lower quality of life (Hartmann et al., 2009; Ivanova et al., 2015; Raykos et al., 2017; Tasca et al., 2007). Interpersonal difficulties are linked to the onset and maintenance of numerous psychopathologies, including generalised anxiety disorder (Borkovec et al., 2002), social anxiety disorder (Tonge et al., 2020), major depressive disorder (Dinger et al., 2014), personality disorders (Giard et al., 2017; Wilson et al., 2017), alexithymia (Vanheule et al., 2006), substance use disorders (Hassel et al., 2023), and eating disorders (Fairburn et al., 2003). Interpersonal difficulties have been causally implicated in the maintenance of eating disorder symptomatology (Fairburn et al., 2003; Reiger et al., 2010), and are strongly associated with nonclinical disordered eating behaviours and eating disorders including bulimia nervosa, anorexia nervosa, binge eating disorder, other specified feeding or eating disorder, and unspecified feeding or eating disorder (American Psychiatric Association, 2022; Broberg et al., 2001; Lampard et al., 2011; Murphy et al., 2012). There is also evidence that interpersonal difficulties predict poorer treatment outcomes for eating disorders (Fairburn et al., 2003; Hartmann et al., 2009).

Fairburn et al.'s (2003) transdiagnostic theory of eating disorders describes core mechanisms in the onset and maintenance of eating disorder symptomatology, including the over-evaluation and over-control of eating, weight, and shape, clinical perfectionism, low self-esteem, mood intolerance, and interpersonal difficulties. Interpersonal difficulties are theorised to perpetuate eating disorder symptoms by negatively impacting core eating

disorder psychopathology and subsequently driving disordered eating behaviours that establish a temporary sense of control (Fairburn et al., 2003). Reiger et al.'s (2010) interpersonal model of eating disorders describes how interpersonal disputes and deficits, negative self-evaluation and low core self-esteem, and disordered eating behaviors interact to maintain eating disorders (Rieger et al. 2010).

While the link between interpersonal difficulties and eating disorders is well-established (Arcelus et al., 2013; Rieger et al., 2010; Treasure et al., 2012), and there is evidence that CBT and interpersonal psychotherapy have positive impacts on eating disorder symptoms and interpersonal problems (Zhang et al., 2024), eating disorder research has predominantly used generic measures of interpersonal difficulties (e.g., Inventory of Interpersonal Problems-32, IIP-32; Barkham et al., 1996). Consequently, there is limited knowledge discerning the unique role of interpersonal difficulties that are specific to eating disorder pathology. To address this gap, Jones et al. (2019) developed the Interpersonal Relationships in Eating Disorders scale (IR-ED), which measures eating-specific interpersonal difficulties across dimensions of food-related isolation, avoidance of body evaluation, and food-related interpersonal tension. In a non-clinical undergraduate sample using cross-sectional data ($N = 396$; Jones et al., 2019), the IR-ED accounted for unique variance in eating disorder psychopathology beyond measures of general interpersonal difficulties such as the IIP-32 (Barkham et al., 1996) and the Brief Fear of Negative Evaluation Scale (Rodebaugh et al., 2004). In a clinical eating disorder sample ($N = 107$), the IR-ED accounted for 46% of the variance in eating disorder psychopathology (Jones et al., 2019). Lego et al. (2024) evaluated the IR-ED cross-sectionally in a clinical treatment-seeking sample ($N = 437$) and found evidence for a strong general factor. The IR-ED explained 53% of the variance in eating disorder psychopathology, was invariant across clinical and non-clinical samples, demonstrated convergent validity with a generic measure

of interpersonal problems, and had incremental predictivity utility beyond other predictors of eating disorder psychopathology (mood intolerance, perfectionism, self-esteem) and co-occurring symptoms (anxiety, depression). While these findings indicate that the IR-ED may be an important factor maintaining eating disorder psychopathology, changes in the IR-ED during treatment, and the relationship between changes in IR-ED and changes in eating disorder symptoms, have not previously been investigated. Understanding these prospective relationships will strengthen causal inferences and is critical given that cross-sectional associations are not always observed prospectively (Maxwell & Cole, 2007).

Cognitive-behavioural treatments are evidence-supported for eating disorders (National Institute for Health and Care Excellence guidelines, 2017). Outcomes from a relatively brief and cost-efficient intervention for eating disorders that emphasises behaviour change, ten-session cognitive behavioural therapy (CBT-T; Waller et al., 2019), compare favourably to longer cognitive behavioural therapies, with improvements maintained at one-, three-, and 6-month follow-up (Pellizzer et al., 2019; Tatham et al., 2020; Wade et al., 2021; Waller et al., 2019). However, it remains unknown whether CBT-T is associated with reductions in eating-specific interpersonal difficulties, treatment progress is impeded by pre-existing eating-specific interpersonal difficulties, or changes in eating-specific interpersonal difficulties are associated with changes in eating disorder symptoms and psychosocial impairment during treatment. Given the emphasis of CBT-T on early rapid symptom change (e.g., nutritional restoration, exposure therapy), without an explicit or extended focus on interpersonal difficulties, it is particularly important to assess whether CBT-T is associated with improvements in interpersonal difficulties. Rapid reductions in eating disorder symptoms may indirectly improve eating-specific interpersonal difficulties, meaning that these do not need to be directly targeted. Alternatively, not directly targeting interpersonal difficulties may lead to less change, which could serve as a risk factor for relapse.

The aims of this study were to (a) explore changes in eating-specific interpersonal difficulties, symptoms of disordered eating, and associated psychosocial impairment over the course of CBT-T, (b) assess whether initial levels of eating-specific interpersonal difficulties impact the trajectory of change in symptoms and psychosocial impairment, and (c) investigate the relationship between change in eating-specific interpersonal difficulties and change in symptoms and psychosocial impairment. The first hypothesis was that eating-specific interpersonal difficulties, eating disorder symptoms, and psychosocial impairment would reduce over the course of CBT-T. The second hypothesis was that eating-specific interpersonal difficulties at pre-treatment would moderate changes in symptoms and psychosocial impairment over the course of CBT-T, such that higher levels of pre-treatment interpersonal difficulties would be associated with less change in symptoms and psychosocial impairment. The third hypothesis was that change in eating-specific interpersonal difficulties would be concurrently and prospectively associated with change in eating disorder symptoms and psychosocial impairment. It is also plausible that early change in eating disorder symptoms and psychosocial impairment would be prospectively associated with changes in interpersonal difficulties, so these relationships were also explored.

Method

Participants

Data were extracted from a pre-existing database of treatment-seeking individuals referred to a specialised community-based eating disorder outpatient service. Inclusion criteria were: (1) 18 years of age or older; (2) a formal eating disorder diagnosis in line with Diagnostic and Statistical Manual of Mental Disorders diagnostic criteria (American Psychiatric Association, 2013). Exclusion criteria for CBT-T were: (1) Body Mass Index (BMI) < 18.5 to ensure any required weight restoration was feasible within the brief intervention (Waller et al., 2019); (2) severe misuse of alcohol or other drugs requiring

specialist treatment; (3) concurrent diagnosis in the psychotic spectrum; (4) receiving treatment as an inpatient in a psychiatric hospital.

Measures

Eating-Specific Interpersonal Difficulties

Eating-specific interpersonal difficulties over the previous 28 days were measured using scores on the 15-item IR-ED (Jones et al., 2019; Lego et al., 2024). Items were rated on a 5-point Likert scale ranging from 1 (*Not at all*) to 5 (*All the time*), with higher scores indicating more severe eating-specific interpersonal difficulties. Within a clinical sample, the IR-ED total score demonstrates high internal reliability (ω = .91, Lego et al., 2024). Internal reliability within the current sample was high at pre-, mid- and post-treatment (ω = .87 - .91). The IR-ED total score was used, as the subfactors have not demonstrated sufficient unique variance from the general factor (Lego et al., 2024).

Eating Disorder Symptoms

Eating disorder symptoms over the past 28 days were assessed using the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 2008). The EDE-Q assesses frequency of symptoms across four domains: dietary restraint, eating concerns, weight concerns, and shape concerns. Each item is scored on a 7-point Likert scale ranging from 0 (*No days*) to 7 (*Every day*), with higher scores indicating a greater level of symptoms. The EDE-Q Global score represents the average of the four domains and was used to capture overall eating disorder severity. In both clinical and nonclinical samples, the EDE-Q has demonstrated robust psychometric properties (Berg et al., 2012; Luce & Crowther, 1999; Peterson et al., 2007). Within the current sample, the EDE-Q Global had excellent internal reliability across all timepoints (ω = .89 - .96).

Psychosocial Impairment

Psychosocial impairment over the past 28 days was assessed using total scores on the 16-item self-report Clinical Impairment Assessment (CIA; Bohn & Fairburn, 2008; Raykos et al., 2019). Items were rated on a 4-point Likert scale from 0 (*Not at all*) to 3 (*A lot*), with higher total scores indicating a greater level of psychosocial impairment. Within the current sample, the CIA revealed excellent internal reliability across all timepoints (ω = .90 - .94).

Procedure

Ethical approval was obtained from the [redacted for review] Health Service's (RGS6345) and [redacted for review] University's (HRE2023-0562) Human Research Ethics Committees. Patients were referred to the clinic by a medical practitioner, after which they attended a clinical interview to establish their clinical diagnosis using the Eating Disorder Examination Interview (EDE Version 12; Fairburn & Cooper, 1993). Patients were offered CBT-T if they met eligibility criteria. Data were collected as part of routine outcome monitoring, with measures being completed at pre- (assessment), mid- (session 5), and post-treatment (session 10). All patients were invited to read an information sheet and sign a consent form for their data to be used for quality improvement and research purposes.

Research Design and Intervention

CBT-T is a manualised outpatient treatment designed for non-underweight patients (BMI ≥ 18, Waller et al., 2019) that incorporates evidence-based components of cognitive behavioural therapy for eating disorders (CBT-ED). The ten sessions involve: 1) psychoeducation and initial dietary change, 2) addressing dietary content and feared foods, 3) increasing regular carbohydrate intake and introducing binge-eating prevention strategies, 4) progress review and cognitive restructuring, 5) exploring further cognitions for behavioural experiments, 6) challenging body image cognitions through behavioural experiments, 7) addressing body image and emotional triggers, 8) addressing body image and emotional triggers, 9) addressing body image, emotional triggers, and relapse prevention, 10) relapse

prevention. All sessions include collaborative, open weighing and components of reviewing eating behaviours through monitoring sheets.

Data Analysis

To test hypothesis 1, we explored changes in interpersonal difficulties, symptoms and psychosocial impairment using descriptive statistics by fitting mixed-model repeated measures (MMRM) regression models in IBM SPSS Statistics version 29 (IBM Corp, 2022). These targeted the de jure (efficacy) treatment effect estimand (Mallinckrodt et al., 2020). All data collected were included in analyses. Time was modelled as a categorical fixed factor with three levels (pre-, mid-, post-treatment), and an unstructured covariance matrix employed to model the residual covariance structure. The method of estimation was restricted maximum likelihood (REML), and Satterthwaite degrees of freedom used to calculate inferential statistics. For each outcome we estimated marginal means at pre, mid, and post-treatment, and calculated standardised effect sizes (Cohen's *d*) by dividing changes by the pre-treatment standard deviation (Feingold, 2009).

To test hypothesis 2, we used MMRM models with time, IR-ED, and time x IR-ED as fixed effects. Three-way interactions (time x IR-ED x BMI; time x IR-ED x Principal diagnosis) were assessed in separate models. Following a similar approach to Kenny et al. (2024), we conducted a complementary linear regression analysis whereby pre-treatment EDE-Q/CIA scores were modelled as a covariate (rather than part of the dependent variable), such that the dependent variable was mid-treatment or post-treatment EDE-Q/CIA score and the predictors were pre-treatment EDE-Q/CIA scores, pre-treatment IR-ED, and their interaction. This analysis tests the unique effect interpersonal difficulties on change in psychopathology that is not mediated by pre-treatment severity, and therefore provides an additional test for moderation that controls for potential regression to the mean.

To test hypothesis 3, we used bivariate correlations to examine concurrent changes in eating-specific interpersonal difficulties, eating disorder symptoms, and psychosocial impairment from pre- to mid-treatment, mid- to post-treatment, and from pre- to post-treatment. Partial correlations were used to examine prospective relationships between early changes in eating-specific interpersonal difficulties and later changes in eating disorder symptoms and psychosocial impairment, controlling for early change in symptoms and psychosocial impairment. The reverse was also tested, where early change in symptoms and psychosocial impairment were correlated with later changes in interpersonal difficulties, controlling for early changes in interpersonal difficulties. Pairwise deletion was used to handle missing data for the correlational analyses. This study was not pre-registered.

Results

Sample Characteristics

Patients (N = 126, see Table 1) ranged in age from 16 to 66 years, but the majority were young women who were born in Australia (n = 95, 75.4%) and came from an Anglo/European cultural background (n = 101, 80.1%); Asian was the second most common cultural background (n = 8, 6.4%). Most patients were diagnosed with Bulimia Nervosa (BN) or atypical BN (n = 70, 55.6%), followed by Anorexia Nervosa in partial remission (AN) or atypical AN (A-AN; n = 40, 31.7%). All patients with AN or A-AN had a BMI ≥ 18.5. Median time since the onset of the eating disorder was 6 years (maximum = 42 years); a history of self-harm, suicide attempts and psychiatric hospitalisation were common; and almost three-quarters of the sample (n = 90, 71.4%) had at least one other disorder (Table 1).

Treatment Completion

Just over half (n = 67, 53.2%) of the patients who started CBT-T completed therapy, with most (63/67, 94%) completers attending all 10 sessions. Four significantly improved in 6 to 9 sessions, so treatment ceased early. Patients who dropped out attended a median of 4

sessions [IQR: 3, 6], with the primary reason being an absence of behaviour change or no improvement (n = 37, 29.4%); for 18 of those cases, discontinuation occurred following the progress review within the CBT-T protocol, and therefore was planned rather than unexpected. Thirteen cases (10.3%) dropped out for reasons unrelated to treatment (e.g., moving away, work commitments); 2 (1.6%) due to symptom improvement; and 7 (5.6%) stopped attending and could not be contacted to ascertain why. Patients who dropped out did not significantly differ from treatment completers at pre-treatment on the IR-ED, $t(124) = 0.65$, $p = .52$, $d = .12$. Pre-treatment IR-ED was also not significantly correlated with number of sessions attended ($r = .03$, $p = .73$).

Average Treatment Effects

Bivariate correlations at pre-treatment, and between pre- to post-treatment change scores, are reported in Supplementary Table 1. Table 2 shows that EDE-Q, CIA, and IR-ED all reduced substantially during treatment. Table 3 shows that the treatment was associated with rapid early changes, with standardised effect sizes ranging between .72 and 1.47 across the outcomes between pre- and mid-treatment. Average outcomes continued to improve over the second half of therapy, and pre- to post-treatment effect sizes were very large (d = 1.33 - 2.43) and statistically significant. Mean scores on the EDE-Q and CIA showed substantial reductions from high above to below the clinical range.

Moderation Models

Pre-treatment IR-ED scores did not moderate change in EDE-Q, $F(2, 68.42) = 1.10$, $p = .340$) or CIA scores, $F(2, 56.01) = 1.74$, $p = .184$ (see Supplementary Table 2 for statistics). There were also no significant three-way interactions between time, interpersonal difficulties and BMI when EDE-Q ($p = .271$) or CIA ($p = .671$) was the dependent variable. Three-way interactions between time x IR-ED x BMI were also not statistically significant for EDE-Q ($p = .703$) or CIA ($p = .566$).[1] Linear regression analyses with pre-treatment EDE-Q or CIA, IR-

ED scores, and their interaction as predictors also revealed a non-significant interaction effect for post-treatment EDE-Q (Estimate = -.21, SE = .17, standardised estimate = -.14, p = .22) and CIA scores (Estimate = -.15, SE = .16, standardised estimate = -.11, p = .34). The same pattern of non-significant effects was observed when mid-treatment EDE-Q (Estimate = -.09, SE = .14, standardised estimate = -.05, p = .54) and CIA (Estimate = -.09, SE = .14, standardised estimate = .06, p = .53) scores were entered as dependent variables. These findings indicate that the lack of an interaction effect is not due to regression to the mean.

Associations between changes in IR-ED, symptoms and impairment

Correlations between change scores for IR-ED, EDE-Q, and CIA across pre- to mid-treatment, mid- to post-treatment, and pre- to post-treatment periods were all statistically significant and medium to large in magnitude (r = .48 to .78, all ps < .001). A prospective partial correlation revealed that, after controlling for pre- to mid-treatment EDE-Q changes, pre- to mid-treatment changes in IR-ED were not significantly associated with mid- to post-treatment EDE-Q scores (r = -.08, p = .41). Likewise, after controlling for pre- to mid-treatment CIA changes, pre- to mid-treatment changes in IR-ED were not significantly associated with mid- to post-treatment CIA change scores (r < .01, p = .99). Therefore, early changes in IR-ED were not significantly associated with later changes in EDE-Q or CIA. Similarly, after controlling for pre- to mid-treatment changes in IR-ED, pre- to mid-treatment changes in EDE-Q (r < -.08, p = .59) or CIA (r < -.07, p = .64) were not significantly associated with later changes in IR-ED.

Discussion

The aims of this study were to investigate (1) changes in eating-specific interpersonal difficulties, eating disorder symptoms and associated psychosocial impairment during ten-session cognitive-behavioural therapy for eating disorders (CBT-T; Waller et al., 2019), (2) whether eating-specific interpersonal difficulties moderate changes in outcomes, and (3)

whether changes in eating-specific interpersonal difficulties were associated with changes in outcomes. The first hypothesis, that eating-specific interpersonal difficulties, symptoms, and psychosocial impairment would significantly reduce during CBT-T, was supported. The second hypothesis, that eating-specific interpersonal difficulties at pre-treatment would moderate change in eating disorder symptoms and psychosocial impairment over the course of CBT-T, was not supported. Initial levels of eating-specific interpersonal difficulties did not impact the rate of improvement in eating disorder symptoms or psychosocial impairment, regardless of principal eating disorder diagnosis or body mass index (BMI). The third hypothesis, that changes in eating-specific interpersonal difficulties would be concurrently and prospectively associated with changes in eating disorder symptoms and psychosocial impairment over the course of CBT-T, was partially supported. There were concurrent but not prospective relationships between change in eating-specific interpersonal difficulties and change in eating disorder symptoms and psychosocial impairment.

Previous research has demonstrated that longer forms of CBT and interpersonal psychotherapy are effective at reducing eating disorder symptoms (Zhang et al., 2024). This study is the first to demonstrate that brief CBT-T is not only associated with improvements in eating disorder symptoms and psychosocial impairment, but also in eating-specific interpersonal difficulties. These findings are consistent with theories that emphasise the importance of reciprocal relationships between eating disorder symptoms and interpersonal difficulties (Fairburn et al., 2003; Murphy et al., 2012; Reiger et al., 2010), and are particularly interesting given that interpersonal difficulties are not an explicit focus of CBT-T, although they may be addressed within the context of behavioural experiments and surveys (e.g. eating in front of others, body image surveys).

The current findings demonstrate that higher pre-treatment eating-specific interpersonal difficulties did not adversely impact outcomes from CBT-T, regardless of

primary eating disorder diagnoses or BMI. This contrasts with previous research that has consistently found that scores on generic measures of interpersonal difficulties are associated with poorer outcomes in cognitive behavioural therapy for eating disorders (Agras et al., 2000; Harttmann et al., 2009). One explanation for this discrepancy may be that the IR-ED captures interpersonal difficulties that are more directly targeted in CBT whereas broader patterns of interpersonal difficulties are not. For example, Lego et al. (2024) suggested the IR-ED may measure more proximal motivations that drive interpersonal difficulties that could be particularly helpful for guiding case formulation and treatment planning. Generalised or trait-based interpersonal difficulties may indeed interfere with one's capacity to effectively engage in psychotherapy and may subsequently hinder the extent of benefits received from eating disorder treatments. However, the present study reveals that this effect does not extend to interpersonal difficulties that are specific to eating disorder pathology. It is plausible that addressing eating disorder-specific interpersonal difficulties may help to resolve broader interpersonal patterns, although future research is required to investigate this possibility. Our findings do suggest, however, that eating-specific interpersonal difficulties are not a barrier to positive treatment outcomes and that they improve during CBT-T.

An alternative explanation for the finding that eating-specific interpersonal difficulties did not impact treatment outcomes may be that the brevity of CBT-T and emphasis on early behavioural and cognitive change may rapidly ameliorate eating-specific interpersonal difficulties that co-occur with eating disorder symptoms. Rapid symptom change is the most consistent predictor of favourable treatment outcomes across eating disorder diagnoses (Hilbert et al., 2019; Linardon et al., 2016; Vall & Wade, 2015; Waller et al., 2018), and symptom change tends to predict stronger subsequent therapeutic alliance rather than vice versa (Raykos et al., 2014). The emphasis of CBT-T on early symptom change may therefore elicit rapid concurrent relief in related interpersonal difficulties.

Differences in sample characteristics across studies may also explain why eating-specific interpersonal difficulties did not impact outcomes in the current study. CBT-T is used exclusively with patients classified as non-underweight (BMI ≥ 18.5), whereas other treatments include medically stable patients with a lower BMI (e.g., enhanced cognitive-behavioural therapy; Fairburn, 2008). The exclusion of underweight individuals in our study, and thus the small proportion of patients diagnosed with anorexia nervosa, may have led to outcomes that were less impacted by interpersonal difficulties. Whilst individuals with suppressed weight at any BMI can experience medical complications, cognitive rigidity, inflexible disordered eating behaviours, and thus slower time to remission (Gaudiani, 2018; Garber et al., 2019; Lowe et al., 2011; Montani et al., 2015), it is plausible that individuals with a very low BMI are perceived by others to be malnourished and thus experience greater interpersonal pressures and tensions related to their eating disorders.

The lack of prospective relationships indicates that changes in eating disorder-specific interpersonal difficulties and outcomes may occur contemporaneously, or temporal relationships may be evident over shorter durations than assessment periods in this study. It is plausible that dynamic reciprocal relationships exist, whereby change in eating disorder symptoms relieves eating-specific interpersonal difficulties and vice versa. Future studies that assess session-by-session change may detect these relationships.

Theoretical and Practical Implications

Models of eating disorders suggest that interpersonal difficulties represent a key maintaining factor for eating disorder symptomatology (Arcelus et al, 2012; Fairburn et al., 2003; Rieger et al., 2010; Treasure et al., 2012). Importantly, the present study extends existing literature by exploring eating-specific interpersonal difficulties and assessing how these difficulties change during treatment, how pre-existing eating-specific interpersonal difficulties impact treatment, and how change in eating-specific interpersonal difficulties is

associated with change in eating disorder symptoms and psychosocial impairment during treatment. The current findings could be used to refine existing theories with respect to the specific nature of common eating disorder-specific interpersonal difficulties likely to contribute to the maintenance of eating disorders.

The current study has several practical implications. First, the findings indicate that CBT-T is effective for reducing eating disorder symptoms and psychosocial impairment, regardless of initial eating-specific interpersonal difficulties. Second, the findings that the IR-ED is sensitive to change during treatment, and that IR-ED changes are associated with changes in eating disorder symptoms, offers empirical support for using the IR-ED in assessment, formulation, and outcome monitoring. Third, the present study provides normative data for eating-specific interpersonal difficulties, which may be beneficial for identifying elevated presentations that can inform treatment planning. Fourth, the effect sizes within our clinical sample can assist in benchmarking against future treatment enhancements, which is important given that individuals with more eating-specific interpersonal difficulties started and ended treatment with more severe eating disorder symptoms and psychosocial impairment. Adjunctive interventions that explicitly target relational factors could include concurrent or sequential individual sessions to develop patients' interpersonal skills, carer support sessions to increase skills for managing relationships with the individual with the eating disorder, or family sessions. Fifth, identifying patients with low levels of eating-specific interpersonal difficulties can direct interventions toward more relevant targets and indicate that the patient's social network is a valuable source of social support.

Limitations and Directions for Future Research

The findings of the present study must be considered in light of several limitations. First, the dropout rate was fairly high, although that was partly driven by the protocol which deliberately terminated treatment when patients were disengaged or not making sufficient

progress to warrant benefit in continuation. The average treatment effect analyses incorporated data from all patients (including dropouts) and represent expected benefits of completing a full course of treatment, but in practice only around half of patients who enter therapy complete it. Second, the high proportion of women may limit generalisability to other genders. Third, future research should evaluate the generalisability of these findings to different eating disorder treatments, such as those that include individuals with BMI's < 18.5, are longer in duration, and include family members. Fourth, the measures were self-report from the perspective of the individual with the eating disorder. Given the inherently relational nature of interpersonal difficulties, future research should investigate if our findings replicate when assessing others' perspectives on interpersonal difficulties (e.g., family members, clinicians). Fifth, future research should investigate if changes maintain beyond treatment, and whether eating-specific interpersonal difficulties serve as a risk factor for relapse.

Conclusion

The present study demonstrates that CBT-T is associated with large reductions in symptoms, psychosocial impairment, and eating disorder-specific interpersonal difficulties, and that symptom and psychosocial impairment reductions are not impacted by pre-treatment interpersonal difficulties, specific principal eating disorders, or BMI. The findings extend theoretical models of eating disorders by describing the nature of some key eating-specific interpersonal difficulties. The IR-ED is sensitive to change and may facilitate more nuanced individualised case formulations, treatment planning, and outcome monitoring. Future research should investigate if adjunctive interventions targeting the interpersonal difficulties measured by the IR-ED can enhance outcomes.

Footnotes

[1] Due to the low number of patients diagnosed with an anorexia nervosa (n = 6) or unspecified feeding or eating disorder (n = 8), only bulimia nervosa (n = 62) and other specified feeding and eating disorders (n = 50) were included in these moderator models involving principal diagnosis.

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Table 1.

Pre-Treatment Demographic and Clinical Characteristics

Demographic Variable	*n*(%), *M(SD),* or *Mdn[IQR]*
Female	124 (98.4%)
Age (median)	23 [20, 30]
Employed or studying	106 (84.1%)
Relationship Status	
Single	69 (54.8%)
In a relationship, not cohabiting	21 (16.7%)
Married / defacto	34 (27.0%)
Separated	2 (1.6%)
Principal Diagnosis	
Anorexia Nervosa (in partial remission)	6 (4.8%)
Bulimia Nervosa	62 (49.2%)
OSFED	50 (39.7%)
Atypical Anorexia Nervosa	34 (27.0%)
Atypical Bulimia Nervosa	8 (6.4%)
Purging Disorder	8 (6.3%)
UFED	8 (6.4%)
Years since onset of ED (median)	6 [2, 12]
Most Common Co-Occurring Diagnoses	
Major Depressive Disorder	38 (30.2%)
Persistent Depressive Disorder	19 (15.1%)
Generalised Anxiety Disorder	50 (39.7%)
Social Anxiety Disorder	33 (26.2%)
Other Clinical Features	
Ever self-harmed	74 (58.7%)
Ever attempted suicide	46 (36.5%)
Ever hospitalised for psychiatric problems	52 (41.3%)
Using psychotropic medication	69 (56.1%)
Pre-treatment scores	
IR-ED	3.14 (.85)
EDE-Q Global	4.29 (.96)
CIA	32.58 (9.01)
BMI	24.43 (4.92)

Note. OSFED = Other Specified Feeding or Eeating Disorder; UFED = Unspecified Feeding or Eating Disorder; EDE-Q = Eating Disorder Examination Questionnaire; CIA = Clinical Impairment Assessment; IR-ED = Interpersonal Relationships in Eating Disorders scale total score; BMI = Body Mass Index.

Table 2.

Estimated Marginal Means and Standard Errors

Measure	Pre-Treatment		Mid-Treatment		Post-Treatment	
	Mean	SE	Mean	SE	Mean	SE
IR-ED	3.14	0.08	2.54	0.10	2.01	0.09
EDE-Q	4.29	0.09	2.88	0.14	1.96	0.14
CIA	32.58	0.80	23.78	1.23	15.20	1.25

Table 3.

Pre-Mid and Pre-Post Treatment Mean Changes and Effect Sizes

	Mean Change		Standardized Mean Change	
Measure	Est	95% CI	*d*	95% CI
IR-ED				
Pre - Mid	0.61	0.44, 0.77	0.72	0.52, 0.91
Pre - Post	1.13	0.96, 1.31	1.33	1.13, 1.54
EDE-Q				
Pre - Mid	1.41	1.65, 1.17	1.47	1.22, 1.72
Pre - Post	2.33	2.05, 2.61	2.43	2.14, 2.72
CIA				
Pre - Mid	8.80	6.57, 11.02	0.98	0.73, 1.22
Pre - Post	17.38	14.90, 19.86	1.93	1.65, 2.20

Note. EDE-Q = Eating Disorder Examination Questionnaire; CIA = Clinical Impairment Assessment; IR-ED = Interpersonal Relationships in Eating Disorders scale total score; *d* = Standardized Mean Change.

Supplementary Table 1.

Descriptive Statistics and Correlations Between Pre-Treatment Variables (Pre- to Post-Treatment Change Scores)

Measure	1	2	3
1. IR-ED			
2. EDE-Q	.58**(.53**)		
3. CIA	.65**(.71**)	.72**(.66**)	

Note. EDE-Q = Eating Disorder Examination Questionnaire; CIA = Clinical Impairment Assessment; IR-ED = Interpersonal Relationships in Eating Disorders scale total score; BMI = body mass index.

* $p < .05$; ** $p < .01$.

Supplementary Table 2.

Moderation Model Statistics

BMI		Principal Eating Disorder Diagnosis	
Outcome	Effect	Outcome	Effect
EDE-Q		EDEQ	
IR-ED	$F(1, 86.74) = 0.00, p = .949$	IR-ED	$F(1, 73.65) = 1.16, p = .285$
BMI	$F(1, 85.45) = 0.74, p = .392$	Diagnosis	$F(1, 76.14) = 0.10, p = .748$
Time	$F(2, 65.61) = 0.19, p = .830$	Time	$F(2, 54.85) = 0.09, p = .917$
IR-ED x BMI	$F(1, 86.78) = 1.61, p = .207$	IR-ED x Diagnosis	$F(1, 76.56) = 0.01, p = .930$
Time x BMI	$F(2, 65.12) = 0.89, p = .417$	Time x Diagnosis	$F(2, 54.52) = 0.10, p = .909$
IR-ED x time	$F(2, 65.24) = 1.16, p = .319$	IR-ED x time	$F(2, 54.65) = 0.36, p = .697$
IR-ED x BMI x time	$F(2, 64.87) = 1.33, p = .271$	IR-ED x Diagnosis x time	$F(2, 54.52) = 0.36, p = .703$
CIA		CIA	
IR-ED	$F(1, 80.34) = 0.36, p = .548$	IR-ED	$F(1, 65.55) = 1.84, p = .179$
BMI	$F(1, 78.64) = 0.15, p = .701$	Diagnosis	$F(1, 67.65) = 0.05, p = .823$
Time	$F(2, 63.76) = 1.05, p = .354$	Time	$F(2, 50.88) < 0.01, p > .999$

IR-ED x BMI	$F(1, 80.17) = 0.53$, $p = .468$	IR-ED x Diagnosis	$F(1, 68.85) = 0.02$, $p = .879$
Time x BMI	$F(2, 63.35) = 0.80$, $p = .455$	Time x Diagnosis	$F(2, 52.87) = 0.11$, $p = .901$
IR-ED x time	$F(2, 63.96) = 0.10$, $p = .901$	IR-ED x time	$F(2, 51.55) = 1.09$, $p = .345$
IR-ED x BMI x time	$F(2, 63.61) = 0.40$, $p = .671$	IR-ED x Diagnosis x time	$F(2, 53.58) = 0.58$, $p = .566$

Note. EDE-Q = Eating Disorder Examination Questionnaire; CIA = Clinical Impairment Assessment; IR-ED = Interpersonal Relationships in Eating Disorders scale total score; BMI = body mass index; Diagnosis = principal eating disorder diagnosis.