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University of Southampton

Faculty of Environmental and Life Sciences

School of Psychology

Cognitive Fusion in Eating-related Difficulties – A Cultural Focus

by

Sarah Johnson

Thesis for the degree of Doctorate in Clinical Psychology

May 2025

University of Southampton**Abstract**

Faculty of Environmental and Life Sciences

School of Psychology

Doctorate in Clinical Psychology

Cognitive Fusion in Eating-related Difficulties – A Cultural Focus

By

Sarah Johnson

Acceptance and Commitment Therapy (ACT) theorises that it is the way one relates to their thoughts that causes them to become problematic. The ability to accept or respond to thoughts in accordance with one's values reflects psychological flexibility. Psychological flexibility is established by six core processes, one of these – Cognitive Fusion (CF) has been associated with eating disorders (EDs).

Chapter 1 sets CF within the context of an evidence base criticised for its inattention towards the mechanisms that may underpin the subjective and nuanced experience of it. It clarifies the aims of chapter 2, which is a systematic review identifying themes in studies that have explored factors associated with CF in eating-related difficulties. Data was collected from four databases and 31 studies. Synthesis Without Meta-analysis (SWiM) identified nine factors that were associated with CF in eating-related difficulties, including sociocultural identity. Chapter 3 is a quantitative analysis of relationships between CF, body image-related CF, body checking, religious commitment, hijab (veiling) practice and ED psychopathology using self-report data collected from 108 Muslim women. Hierarchical linear regression was used to enter variables into distinct blocks to assess their contribution to the model's explanation of ED psychopathology. Veiling was significant in its association with lower ED psychopathology when considered alongside religious commitment. When CF variables and body checking were added to the model, veiling became non-significant, and the additional variables held more predictive power in explaining ED psychopathology. Clinical implications and the future direction of research are discussed.

Keywords: Cognitive fusion, Eating-related difficulties, Eating disorders, Muslim women, Psychological flexibility, ACT

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Research Thesis: Declaration of Authorship

Print name: SARAH JOHNSON

Thesis Title: The role of Cognitive Fusion in Eating-related Difficulties – A Cultural Focus

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
I have acknowledged the use of the ChatGPT tool (OpenAI); <https://chatgpt.com/> in the generation of ideas, and for researching and seeking answers in the drafting of content.
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission.

Signature: Date: 17/09/2025

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List of Abbreviations

ACT Acceptance and Commitment Therapy

AN Anorexia Nervosa

BC Body Checking

BCQ Body Checking Questionnaire

BI-CF Body-Image Cognitive Fusion

BMI Body Mass Index

BED Binge Eating Disorder

BN Bulimia Nervosa

BPS British Psychological Society

CBT Cognitive Behavioural Therapy

CBT-E Enhanced Cognitive Behavioural Therapy for Eating Disorders

CF Cognitive Fusion

CFQ Cognitive Fusion Questionnaire

CFQ-BI Cognitive Fusion-Body Image

EDs Eating Disorders

EDE-Q Eating Disorders Examination-Questionnaire

ERGO Ethics and Research Governance Online

NICE National Institute for Health and Care Excellence

PiS Participant information Sheet

PPI - Patient and Public Involvement

PROSPERO International Prospective Register of Systematic Reviews.

RCI Religious Commitment Inventory

SWiM Synthesis Without Meta-analysis

Chapter 1

The role of Cognitive Fusion in Eating-related Difficulties – A Cultural Focus

Word count: 2729

The role of Cognitive Fusion in Eating-related Difficulties – A Cultural Focus

Eating Disorders

“Eating Disorders (EDs) are disabling, deadly, and costly mental disorders that considerably impair physical health and psychosocial functioning.” (Treasure, Duarte & Schmidt, 2020, p. 899). The growing need for effective ED interventions is indicated by global prevalence rates increasing from 3.4% to 7.8% between 2000 and 2018 (Galmiche, 2019). In the UK, hospital admissions for adults with EDs have risen at a rate of 79% over the past decade (van Eeden, van Hoeken & Hoek, 2021). Contextual factors including climate change and the cost-of-living crisis are relevant to these increases. Both have had an impact on food security amidst the aftermath of the Covid-19 pandemic, which likewise imposed constraints on access to food, healthcare and social activity (Devoe et al., 2023; Kosmas et al., 2023; Rodgers et al., 2023). A sense of loss and uncertainty, and exposure to news and social media can amplify stress and heighten susceptibility to psychological difficulties. UK racially and ethnically diverse groups are among those disproportionately affected by the socioeconomic and psychological burdens associated with these events (Jackson et al., 2025; Tannerah et al., 2024).

Cognitive Fusion in Eating Disorders

Relational Frame Theory (RFT) proposes that human language and cognition is based upon the meaningful relation of different internal and external stimuli (Hayes et al., 2001). From a young age, humans begin to form arbitrary relationships between stimuli which are based on their exposure to different cultural and social interpretations of them. For example, a person may learn to associate being overweight with being ‘bad’ or ‘unacceptable’ due to exposure to societal interpretations of a larger body size as being negatively associated with attributes such as laziness or poor health. Cognitive fusion (CF) is a process whereby the network of meaning formed between language and cognition becomes overly rigid or inflexible. This can lead to the over-identification of thoughts where they are viewed as ‘absolute truth’ rather than as a temporary mental event that can be challenged or observed (Hayes et al., 2012). This can explain how entrenched evaluative and rigid thinking styles maintain different maladaptive behaviours within EDs. For example, an individual experiencing CF may relate sensory experiences of fullness to mean ‘fatness’ or ‘weight gain’ that they associate with being undesirable, potentially leading to decisions to purge or restrict food intake.

This theory lends support to the focus of Acceptance and Commitment Therapy (ACT; Harris, 2009) on cognitive defusion techniques to reduce the dominance of thoughts on behaviour (Faustino et al., 2023; Shafran et al., 1999). ACT is a “third wave” cognitive-behavioural approach that is effective for targeting the transdiagnostic processes outlined by Fairburn’s (2008) theory and the

enhanced cognitive-behavioural (CBT-E) approach to treating EDs (Fairburn et al., 2003; Linardon & Gleeson, 2022). Fairburn (2008) proposed that excessive importance placed on shape and weight, and fixations with diet fundamentally form the core of ED psychopathology (Fairburn, 2008). RFT and ACT may explain how such importance is derived through emphasizing that one's relation to their stimulatory experiences and thoughts influence how powerful they become in shaping feelings or behaviour (Merwin & Wilson, 2009). Fixation with thoughts about shape, weight or diet behaviour can maintain dysfunctional assumptions or negative automatic thoughts (Beck, 1976) and culminate in the profound judgmental and rigid thinking styles common in clinical EDs such as anorexia nervosa (AN; Miles et al., 2023; Tchanturia et al., 2004).

Aims of Chapter 2

Chapter 2 aims to clarify what is currently known about factors associated with CF in EDs. It provides a systematic review of previous research and considers a range of themes relevant to the subjective interpretation of CF experiences. The chapter will discuss its findings within the context of current theory on domain-specific conceptualisations of CF such as 'body-image CF' and 'thought-shape fusion'. These phenomena have been found to mediate relationships between body image, body checking and disordered eating (Ferreira et al., 2014; Mancuso, 2016; Rogers et al., 2018).

Chapter 2 will also discuss the criticisms, limitations and future direction of the research base for CF in eating-related difficulties. This includes the methodological limitation of many studies that have failed to capture and understand the nuanced, cross-cultural factors pertaining to CF experiences in eating-related difficulties (Rogers et al., 2018).

Aims of Chapter 3

Comprising over two billion people worldwide, Muslims represent one of the largest religious communities. However, within the UK they represent a minority group. Use of the term 'minority' to refer to Muslims within this thesis will therefore be reflective of their socio-political positioning within the specific context of the UK and not of their global demographic reality. Chapter 3 will focus on veiling and non-veiling UK Muslim women and investigate relationships between religious commitment, body image-related CF, body checking and ED psychopathology.

Muslim women face some of the largest health inequalities in British society (Pritchard et al., 2025) and are vulnerable to experiences of ED psychopathology. However, they are vastly underrepresented by ED research (Abraham & Birmingham, 2008; Doumit et al., 2017). This is concerning when considering not only their global demographic size, but the distinct set of challenges that may be associated with the intersectionality of their religious, gender and cultural identities. For example, foreign-born Muslim women may experience discrimination while navigating other complex challenges associated with acculturation, including social integration and cultural

identity confusion. Recent reports compound this picture, having identified that UK healthcare systems are culturally insensitive and implicitly biased and that services are underinformed and ill-equipped at supporting religious minorities (Mahmud, 2024; Kapadia et al., 2022).

Islam is a “living phenomenon” shaped by influences that are multifaceted throughout time and place (Rothman, 2021). Its definition extends beyond ‘cultural’ or ‘theological’ viewpoints to include principles and practices upheld by the ‘ulamā, (the Islamic scholars), the tafsīr (the Qu’ran), kalām (dialectical theology), and aḥādīth (prophetic traditions). Chapter 3 investigates whether religious commitment to Islam has a relationship to ED psychopathology in veilers and non-veilers. Religious commitment may correspond with adherence to practices such as veiling and Ramadan. Despite indication of positive associations between religious activities and mental health (Dein et al., 2010; Koenig, 2009), the literature is criticised for its poor attempt at understanding the mechanisms that may underpin such findings (Peres et al., 2018). This is acknowledged through the author’s decision to focus on relationships between religious commitment, CF and body image-related CF.

The wider Western culture and environment can be challenging for Muslims facing the demands of Ramadan in the UK (Latif et al., 2025). This is observed as a month of sawm (fasting), zakat (charitable giving) and salah (prayer). Ramadan’s nature as an event that centres around food, self-discipline and control may increase the sense of social, moral and religious commitment that is experienced during the period (Schielke, 2009). Organisations such as BEAT Eating Disorders recognise this as a contemporary concern that may consequently make it a more confronting time for those struggling with their relationship to food. In acknowledgement, they have published guidance on navigating Ramadan alongside an ED (Naseem, 2022).

The practice of hijab (veiling) has been identified as having positive and negative implications for experiences of objectification and more so for women residing in Western societies. Objectification theory (Fredrickson & Roberts, 1997) posits that self and sexual objectification experiences correlate with body image and eating-related difficulties. This may be compounded through the internalisation of idealised cultural standards of appearance that are portrayed in Western media; as well as through adoption of other’s judgements on the body that influence self-objectification (Tolaymat & Moradi, 2011). Individuals who self-objectify may persistently scrutinize or monitor their appearance relative to internalised beauty standards. This is often at the disregard of appreciating how one’s body may feel or function. Perception of incongruity between one’s appearance and internalised standards can lead to experiences of body shame. The relationships among sexual objectification, internalisation of beauty thin ‘ideals’, and body shame can increase the risk of ED psychopathology, including increased body checking (Al-Mutawa et al., 2019; Moradi et al., 2005).

Overall, the author intends for the thesis to contribute to a more robust and comprehensive understanding of experiences of CF within eating-related difficulties. To achieve this, Chapter 2 aims

to synthesise existing evidence by identifying factors that are associated with CF and eating-related difficulties. Chapter 3 will build on these findings through drawing upon empirical research methods to address current knowledge gaps that consider these phenomena within Muslim women.

Ontology and Epistemology

The author holds a position of constructivism within Chapter 2. A constructivist perspective posits the researcher as a subjective 'observer' of given phenomenon through a unique lens that allows them to interpret the data in consideration of other sources. This lens is influenced by the observer's experiences and understanding of their context (Schwandt, 2003). Despite its SWiM methodology, the review's methodology means that the definition of results will inevitably be influenced by the author's perspective and subjective interpretations. Knowledge in this instance will be constructed through the author's engagement with the secondary data that is collected.

In Chapter 3, the author's methodological decisions are informed by a positivist paradigm which provides a stable framework for exercising judgement in making sense of the data that is collected. Positivism is based on the assertion that the application of quantitative research methodology will generate meaningful results. It is a realist perspective that emphasises an objective view of reality that draws evidence and facts from the scientific measurement of experience (Shar, 2024). The author acts as a value-neutral 'observer' throughout the research process, separating from judgments and personal experiences of the phenomena being investigated.

Positivism is grounded in a philosophy that encompasses determinism and empiricism. This means that influences have determinable causes and actions have predictable outcomes (Giddings & Grant, 2007). Whilst correlational methods cannot infer causality, positivism recognises this by emphasising the requisite for the experimental method in identifying causal relationships.

Reflexivity and Axiology

This thesis explores sensitive topics involving personal, vulnerable and stigmatized experiences of body-image and eating-related difficulties. As a woman with lived experience of an ED, these topics bear personal interest and significance for the author. The research is driven by the author's values of inclusivity, dignity and respect for anyone experiencing the irrefutable pain caused by eating-related or body image-related difficulties. This research is thus somewhat motivated by the author's empathy and personal interest in increasing the knowledge base of ED psychopathology. This also owes to the author's awareness of the underrepresentation of minority groups within research and thus of their vulnerability for poorer outcomes.

Patient-centred care models should incorporate a cultural competence component to inform clinicians' awareness of supporting culturally diverse patients (Renzaho et al., 2013). The author believes that for interventions to be truly person-centred, they should be grounded in research that

considers the experience of a diverse range of populations. Opportunities to optimise the effectiveness of ED interventions therefore lie in the responsibilities of researchers and clinicians to adopt a holistic understanding of the ways that social, spiritual and cultural categories may intersect in its psychopathology.

Ethical Responsibility

The ethical duty of the researcher is underscored by the cross-cultural and sensitive nature of this thesis' topics. The requirement for ethical conduct increases when research activities occur across cultures and where conceptions of ethics may differ (Marshall & Batten, 2004; Singer, 1993). Historically, the complexity of recruiting participants from minority groups has reflected gaps in knowledge concerning the nature of research; mistrust towards research and health professionals; and the stigmatisation of certain health conditions (Raghavan et al., 2018). Power is a key consideration of cross-cultural researchers, especially so within the context of other factors such as previous negative experiences of research relationships or perceived inconsistencies in the cultural competency of researchers (Marshall & Batten, 2004).

Research that is culturally aware, culturally sensitive and culturally competent is evidenced through its application of culturally appropriate data collection tools, methods of analysis and reporting (British Psychological Society, 2014). The culture-generic, culture-specific competence model (Papadopoulos, 2006) proposes two distinct layers to culturally competent research. Culture-generic competence (layer 1) describes the acquisition of knowledge and skills that is translatable across ethnic groups (Gerrish & Papadopoulos, 1999). Layer 2, culture-specific competence, refers to the knowledge and skills that enable the researcher to understand the values and cultural prescriptions operating within a specific cultural group. Underpinning both require the researcher to consider the unique experiences of power, privilege, and social interaction that are influenced by the intersectionality of different dimensions of social identity. Throughout the thesis, the author attends to and reflects on these by drawing on the aspects of identity represented by Burnham's (2018) Social GRRRAACCEESS¹ framework.

This thesis is relevant to the wider fields of clinical psychology, mental health and Islamic Psychology (Al-Karam, 2018a). The Islam and psychology movement advocates for a bespoke approach to psychological practice and research rather than a simple fostering of Western models to fit with the experiences of the Muslim population (Badri, 2020; Rassool, 2023). As an agnostic white British woman, a prevalent concern of the researcher was their gap in Islamic theological knowledge

¹ gender, geography, race, religion, age, ability, appearance, class, culture, ethnicity, education, employment, sexuality, sexual orientation, and spirituality

and its application to psychology and how this affected their capacity to interweave Islamic perspectives into the design, implementation and interpretation of the study.

The overarching research team comprises of non-Muslim, white Caucasian women distinguished from the mix of Muslim women participants who predominantly identify as mixed-race or Pakistani. Patient public involvement (PPI) was thus deliberately drawn upon to enhance reflexivity and to develop culturally relevant methodological and ethical adaptations (Ryan et al., 2011). In chapter 3, PPI took the form of regular consultation with two veiling Muslim women who provided an Islamic lens to plan and reflect on the research process. PPIs also helped to identify biases and assumptions that may inadvertently influence the researcher's approach. The author describes how this was logged through keeping a reflexive account of judgements, assumptions or social processes that they noticed had surfaced across the research process.

Reflection draws the researcher's attention to the role of 'culturalism' in shaping the values, norms and practices of those involved with this research. Culturalism is the idea that societies exist along a continuum of culture and defines human social existence through the similarities and differences within that culture (Stolcke, 1995). 'Ideological culturalism' views individuals as being bound to a distinct 'cultural category' and suggests that individuals can only understand themselves within the cultural limits that are passed to them intergenerationally or from their native countries. Through this lens, individuals within culture may see each other as inherently 'different' and therefore construct each other as not belonging to the wider culture (Stolcke, 1995). Awareness of this judgement is important considering it is often overtly applied by Western countries to Islam, for instance by distinguishing a boundary between the Western "us" and the Muslim "them" (Khan, 2022). This prompts wider reflection on the 'culture-bound' orientation of the field of Psychology towards Western civilisation and its culturally biased early development that was based on studies focussing on white, middle-class children. The field is thus limited by its foundations in Western value systems, paradigms of thought and evidence base, thereby reducing its value to those socialised outside of the Western world (Badri, 2016; Laungani, 2006). Chapter 3 considers this in discussion of the applicability of the theory and cross-cultural validity of the tools that are used in the research.

The author will build on this by discussing their biases and assumptions about religious commitment and veiling, including the researcher's initial oversight of the complexity and nuances that exist within, as well as between faiths. The practice of Islam is multifaceted, and its principles are applied in a diverse range of ways. Likewise, Islamic affiliation does not necessarily mean that all those who identify as Muslim observe its religious doctrine at the same level. This may reflect decisions by Muslim women to adhere to the religious and social values that guide if, why and how they choose to veil (Pirmasari, 2021; Wagner et al., 2012).

Dissemination Plan

The author intends to submit the following papers for publication in the International Journal of Eating Disorders (IJED). The papers are therefore written in line with the author guidelines outlined by the IJED. The IJED is a peer-reviewed journal that focusses on advancing scientific knowledge necessary for understanding, treating and preventing EDs. The open-access nature of the IJED offers the benefit of increased visibility and hence possibly broader readership. This will support with the wider dissemination of findings to those from non-psychological disciplines.

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Chapter 2

A Systematic Review of the Factors Associated with Cognitive Fusion in Eating-related Difficulties

The International Journal of Eating Disorders was selected to guide preparation of this paper. Journal guidelines (Appendix A) that manuscripts should not exceed 7,500 words excluding abstract, tables, figures, and references.

Word count (excluding tables, figures, and references): 6005

Abstract

Objective: Cognitive fusion has been linked to a wide range of psychological difficulties, including eating disorders. However, the underlying patterns or themes that may underpin these associations have not been clearly identified. This systematic review aimed to explore and clarify the factors contributing to the relationship between cognitive fusion and eating-related difficulties. Its objective was to consider how clinicians can strengthen cognitive defusion strategies to improve interventions for eating-related concerns.

Method: A systematic literature search was conducted in Medline, PsycINFO, Embase, and CINAHL databases. Quantitative studies of adults that had investigated cognitive fusion and an eating-related difficulty were included. Due to statistical and methodological heterogeneity, a narrative synthesis that followed adapted Synthesis Without Meta-analysis guidance was completed. An inductive approach was used to thematically synthesise the findings of $n=31$ eligible studies.

Results: Nine factors were associated with the relationship between cognitive fusion and eating-related difficulties. These were: emotional state, shame, relevant demographic confounders, coping strategies, eating habits, personality and individual differences, perceptions or nature of symptoms, body image and sociocultural context. There was consistent evidence of experiences of body-image and shame in the relationship between cognitive fusion and eating-related difficulties.

Discussion: The factors associated with cognitive fusion in eating-related difficulties highlight links between social, cultural and illness identities in influencing cognitive fusion experiences. Findings were largely drawn from observational, cross-sectional studies that relied upon self-report data. The need for further experimental and longitudinal research focussing on cognitive fusion and eating-related difficulties within ethnically diverse populations is discussed.

Additional: For the International Journal of Eating Disorders

Public Significance Statement: This review suggests that the following factors represent important links between a person's tendency to attach to thoughts and the experience of eating-related problems: emotional experiences, shape and weight factors, coping style, eating habits, personality, perceptions of symptoms, body image and culture. These areas may be considered when addressing thought-related problems in eating disorders.

KEY WORDS: cognitive fusion, eating-related difficulties, eating disorders, body image-related cognitive fusion, thought-shape fusion, body image

Key Points:

- Factors associated with cognitive fusion and eating-related difficulties are highlighted.
- Findings on relationships between cognitive fusion and eating disorder psychopathology are largely drawn from female-saturated, observational, cross-sectional studies using self-report data.
- The need for further experimental and longitudinal research focussing on cognitive fusion and eating-related difficulties within more diverse populations is indicated.

Introduction

Cognitive Fusion (CF) is experienced when an individual engages with a thought to the extent that it impacts their emotions or behaviour (Hayes et al., 2012). CF is one of the six processes underpinning psychological flexibility (Fernández Rodríguez et al., 2022; Hayes, 2004), a term coined within Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) to define the ability to stay in contact with the present moment and respond to situations or events in a manner that facilitates the pursuit of valued goals. Grounded in Relational Frame Theory (RFT; Hayes et al., 2001) and central to ACT (Hayes et al., 2006; Gillanders et al., 2014), CF has informed understanding of how language and cognition may contribute to psychological distress. According to RFT, humans instinctively relate their experiences of language, cognitive and sensory stimuli to infer complex meanings that over time, can become automatic or rigid. CF therefore influences whether an individual responds to their thoughts based on their usefulness or context, or whether they respond to them as ‘absolute truths’.

CF is considered a transdiagnostic process because it operates across several psychological difficulties, contributing to emotional distress and maladaptive behaviours in problems such as anxiety, depression and eating disorders (EDs; Faustino, 2021). For example, CF may lead an individual experiencing the thought "other people find me boring" to interpret it as an accurate reflection of reality, rather than as a passing mental event grounded in insufficient evidence. CF with this thought may resultantly influence the individual to avoid social interactions. This avoidance behaviour may then reinforce the thought, so CF can instil a self-perpetuating cycle that maintains a problematic thought. An ACT-based cognitive defusion technique, in this context, would encourage the individual to step back from the thought and observe it as a passing mental event rather than accepting it at face value.

CF may influence an individual's thoughts to take excessive power over their behaviour through interpreting them as accurate truths. The term CF has been used interchangeably in clinical and research contexts with ‘cognitive rigidity’, ‘psychological flexibility’ and ‘thought-action fusion’ (TAF). Although these concepts have overlapping characteristics, there has been wide ranging variation and inconsistency in the terminology used historically to investigate CF. CF is a contributing factor to psychological inflexibility, however it is not synonymous with it (Hayes, 2012). Whilst variations in the terms used to describe CF all relate to the role of thoughts in psychological functioning, there are conceptual and functional nuances (Dennis & Vander Wal, 2010; Hayes, 2006; Shafran et al., 1996). Unclear definition and variation in the application of the term CF risks misrepresenting the functional role of thoughts as well as mislabelling potentially key mechanisms of change in therapy and research (Arch & Craske, 2008; Hayes, 2006; Hayes et al., 2006).

CF is recognised as a process that can become entwined with shape, body and weight-related thoughts (Sandoz et al., 2013; Shafran et al., 1999). This has led to some clarity and distinction over

domains of CF such as body image-related cognitive fusion (BI-CF; Sandoz et al., 2011) and thought-shape fusion (TSF; Shafran et al., 2008). These developments represent research efforts to refine CF into a more measurable and clinically meaningful construct for ED populations. This has led to the development of tools such as the Cognitive Fusion Questionnaire-Body Image (CFQ-BI; Sandoz et al., 2015).

Cognitive Behavioural Therapy (CBT) models of EDs emphasise the role of cognitive processes in intensifying eating-related difficulties (Fairburn et al., 2003). Building on this, transdiagnostic theory (Fairburn et al., 2003; Fairburn, 2008) describes the over-evaluation of shape, weight, and dietary control as key drivers of ED psychopathology. In this context, CF may be viewed as a core process that increases the extent to which thoughts about eating, weight, or shape are interpreted as factually accurate. For example, CF with a fleeting thought such as “I feel bloated, I must be getting fat” may generate feelings of guilt that drive reactive behaviours such as food restriction or purging (Usubini et al., 2022). CF may also increase mood intolerance by intensifying the effect of distressing thoughts and feelings (Legenbauer et al., 2018). Under these conditions, disordered eating may be used as a form of experiential avoidance. For example, binge eating may be used to suppress thoughts about weight-gain or feelings of body-shame or guilt.

Highlighting CF’s potentially central role in maintaining eating-related difficulties, previous findings suggest that BI-CF can significantly predict treatment outcomes for individuals with an ED (Bluett et al., 2016). However, this study investigated CF only within a specific context and clinical population; and so, leave further questions about CF’s operation across different eating-related difficulties, populations, and measures. A systematic review would therefore be valuable to synthesise the existing evidence, clarify common mechanisms, and guide cognitive defusion techniques that target CF. Although there has been some review of adjacent constructs, including psychological flexibility and body-image flexibility (Brichacek et al., 2025; Di Sante et al., 2022), no systematic review has yet synthesised the evidence directly investigating CF as a broader concept around eating-related problems. Rogers et al. (2018) reviewed the role of body-image flexibility in EDs and identified it as a consistent correlate and possible treatment target. However the review also highlighted that adaptive correlates of body-image flexibility, and therefore possibly CF remain underexplored and especially so within diverse populations. Furthermore, a review of interventions highlighted that ACT is likely efficacious for EDs, but studies consistently lack rigor; indicating that further, more expansive review of ACT-based processes alongside individual ED symptoms such as restrictive eating is required (Onnink et al., 2022). Combined, these findings highlight a gap in the review of studies that pinpoint factors associated with CF in the context of specific symptomology indicative of eating-related problems. Given the conceptual overlap between CF, BI-CF and TSF, and the established role of rigid thinking in maintaining ED pathology (Wang et al., 2019), synthesising

this literature may inform early intervention and preventative techniques. This review therefore aims to identify and synthesise the factors that have been associated with CF in eating-related difficulties.

Research on CF has largely focussed on its presentation within clinical ED populations. This may reflect interest in the neurocognitive deficits often linked to the physical consequences of low weight (Keeler et al., 2022; Smith et al., 2018). However, this narrow focus on clinical populations has historically risked oversight of the significant proportion of the general population affected by problematic eating attitudes and behaviours. In the UK, nearly half of adults report an “unhealthy” relationship with food and younger generations report the highest levels of dissatisfaction (Benenden Health, 2022). No comprehensive synthesis has explored the neurobiological, psychological, and social factors underpinning CF in the broad context of non-clinical general populations (Dash & Singh, 2024). This is important as doing so may assist with informing effective and scalable early intervention and preventative measures. This review will hence use ‘eating-related difficulties’ to capture symptomology that stretches beyond just clinical ED diagnoses recognised by diagnostic classification systems. This is with the aim of extending the reach and impact of the review’s findings.

Methods

Protocol and registration

The protocol for this systematic review was registered on Prospero (ID CRD42024502714). The review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Page et al., 2021) statement (Appendix B).

Search Strategy and Databases

Searches of EMBASE, PsycInfo, CINAHL and MEDLINE databases were run in August 2024 using a Boolean search strategy to retrieve literature published between 1st January 1995 and August 1st 2024. Searches were re-run in December 2024 to ensure further relevant studies were included. Studies published prior to 1995 were excluded to avoid yielding outdated information. The searches were leveraged to include some grey literature. Grey literature was excluded unless it was an unpublished thesis manuscript.

The search strings and subject headings (Table 1) were developed in consultation with supervisors and an academic librarian from the University of Southampton.

Table 1*Search terms used to retrieve studies for Systematic Review*

Concept	Search terms
Cognitive Fusion	“CF”, “Cognitive Fusion”, “Thought fusion”, “Defusion*”, “Fusion”, “Cognitive defusion”, “Cognitive distortion”, “Thought defusion”, “Thought-action fusion”, “Thought-action defusion”, “Psychological flexibility”, “Psychological inflexibility”, “Cognitive flexibility”, “Rigid thinking”, “Cognitive inflexibility”, “thought*”, “Thinking style*”
Eating-related difficulties	“Eating difficult*”, “Eating problem*”, Eating difficulties”, “Eating behaviour*”, “Eating challenge*”, “ED*”, “EDs”, “ED”, “Anorexia”, “Anorexia Nervosa”, “Bulimia”, “Bulimia Nervosa”, “Binge-eating Disorder”, “Binge-ED”, “BED”, “Avoidant Restrictive Food Intake Disorder”, “ARFID”, “ED Not Otherwise Specified”, “Eating Disorder Not Otherwise Specified”, “EDNOS”, “ED psychopathology”, “ED symptom*”, “ED symptom*”, “Body check*”, “Weighing”, “Compensatory behaviour*”, “Negative body image”, “Positive body image”, “Weight preoccupation”, “Weight control”, “Body monitoring”, “Restrict*”, “Food restrict*”, “Laxative use”, “Bingeing”, “Purging”,

Study selection

The retrieved literature was exported into EndNote version 20 (The EndNoteTeam, 2013) and duplicates were removed. A visual representation of the study selection process using the PRISMA flow diagram is outlined in Figure 1 (Page et al., 2021). The main reviewer (S.J) independently screened potentially relevant studies through reading title and abstracts ($n=1930$) and applying the inclusion and exclusion criteria described in Table 2. This involved checking inter-rater reliability between S.J and a second reviewer (A.C) who screened titles and abstracts of a sample equating 10% ($n=193$) of the retrieved results. Reviewers were blind to each other’s decision-making by logging their decisions in different EndNote files. Alphabetical codes A-C were used to classify papers based on their eligibility. Group A were papers identified as meeting eligibility for the next stage of screening. Group B were ineligible papers and Group C was assigned to papers that either reviewer was undecided on. Agreement about eligibility of the $n=193$ studies screened by both reviewers was logged and calculated from a matrix containing columns that described each reviewer’s decision on each paper (Appendix C). Additional columns were used to highlight papers that reviewers had

disagreed on or papers which either reviewer had assigned to Group C. This was so these papers could be followed up in consultation with a third reviewer (research supervisor). Each row in the matrix represented each study that was screened. A score of '1' was allocated to studies where agreement was met between S.J and A.C, and '0' for those where agreement had not been met. Reviewer agreement on study eligibility based on the sample of papers screened by both S.J and A.C ($n=193$) was 97.4%. All disagreements about eligibility of papers ($n=5$) that reviewers had not agreed on were resolved through consultation with the third reviewer, and the outcome of this logged using the same matrix.

The next stage of screening involved reviewing full texts to check for eligibility criteria. A sample equating 12% ($n=18$) of papers were reviewed by A.C, and both reviewers continued use of the Group A/B/C assignment criteria and matrix described above. Reviewer agreement on study eligibility based on the ($n=18$) subset of papers was 88.9%. Disagreements between reviewers about the eligibility of ($n=2$) studies were resolved through discussion with a supervisor. Indecisions and disagreements among the reviewers were due to issues concerning clarity of inclusion criteria and the definition of terms described in Table 2.

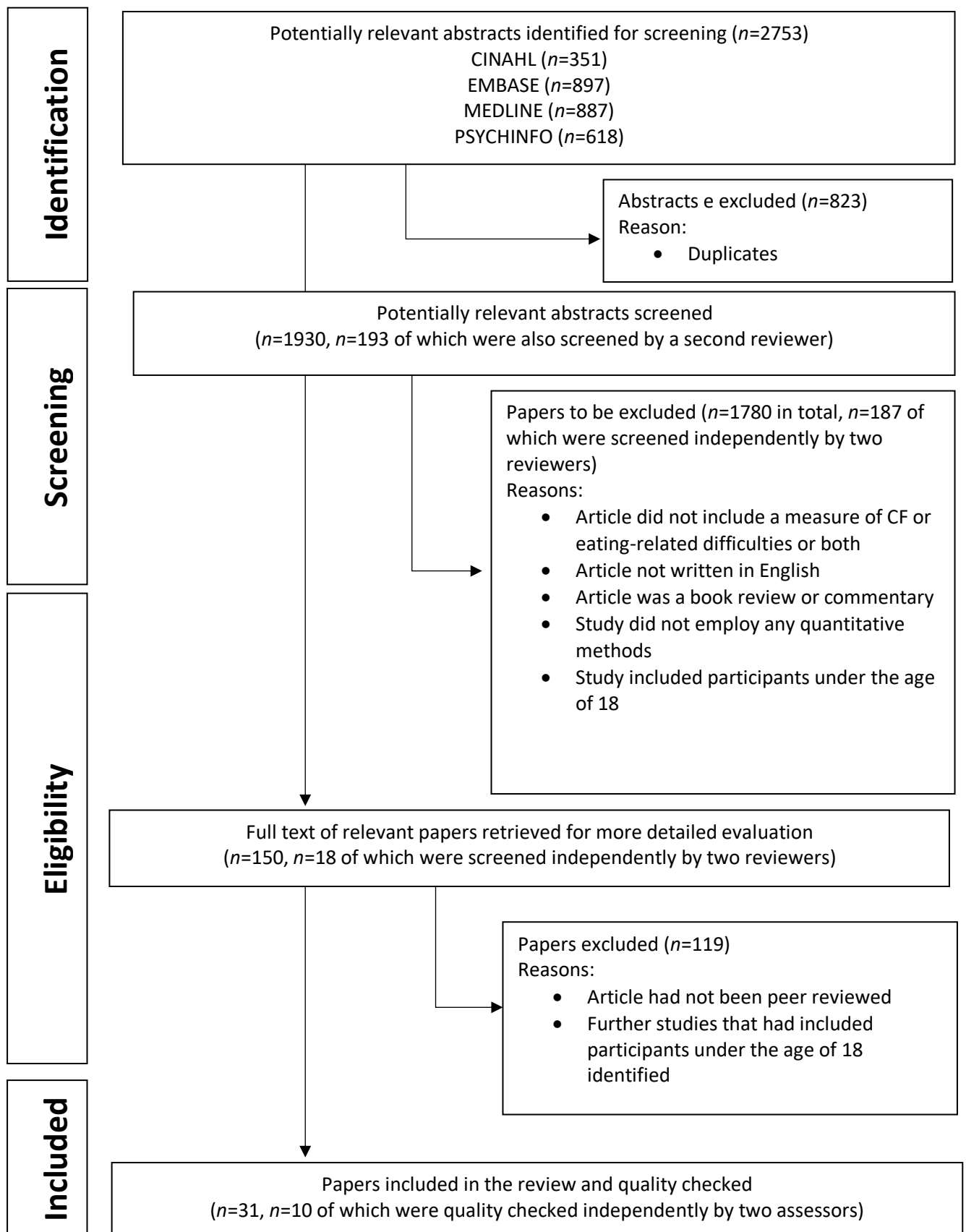
Figure 1*Systematic Review PRISMA diagram*

Table 2*Systematic Review Inclusion and Exclusion Criteria*

Criteria	Inclusion	Exclusion
Participants	Studies that included adult participants over the age of 18	Studies that included ANY participants under the age of 18
Reference of Terms	Studies that referred to ANY of the following: Cognitive Fusion (CF), Body Image-related CF, Thought Shape Fusion (TSF), psychological flexibility, cognitive biases, cognitive processes AND an eating-related difficulty in their title OR abstract	Studies that did not refer to BOTH a CF term AND an eating-related difficulty in their title or abstract.
Definition of Terms	CF was defined through a study's inclusion of a standardised measure of CF, Body Image-related CF, Thought Shape Fusion Psychological Flexibility, or cognitive biases OR through researchers' intention to assess or capture the degree to which an individual's thoughts influenced or dictated the behavioural or emotional experiences of participants (Harris, 2009) 'Eating-related difficulties' were defined through a study's inclusion of a standardised measure of ED psychopathology OR through reference to disordered eating* or ED diagnosis in the abstract *Disordered eating was defined through disturbance of eating habits or weight control behaviour that could result in impairment of physical health or psychosocial functioning (Fairburn & Harrison 2003)	Studies that did NOT define CF or 'Eating-related difficulties according to the Inclusion criteria opposite.
Outcome	Studies that included a measurement of CF, Thought Shape Fusion or Body Image-related CF AND an assessment of eating-related difficulties	Studies that did not include an assessment or measurement of either CF, TSF Body Image-related CF or cognitive process AND an assessment of eating-related difficulties
Study Design	Randomised Controlled Trials, Cohort Studies, Quasi-experimental Studies	Case reports, case series
Publication Characteristics	Peer-reviewed, full-text journal articles Unpublished theses manuscripts Published in English Published 1995-2024	Conference posters and abstracts Published in languages other than English Published before 1995

Appraisal of Study Quality

The quality of included studies was assessed using the 'QualSyst' tool (Kmet et al., 2004; Appendix D). This is a validated tool developed to evaluate a broad range of study designs by producing an overall quality score, with a suggested cut-off score for acceptable quality. The tool examined the following: appropriate sampling, measure quality and appropriateness, confound control and statistical analysis. It included 14 items scored 0-2. Final scores were calculated by dividing the total item score by the maximum possible (e.g., 28 if all 14 items are scored) and reported as percentages to account for non-applicable items.

The evaluation of the quality and risk of bias in each included study is described in Table 4. To assess inter-rater reliability, agreement about study quality was assessed through a random subset equating 33% of papers ($n=10$) being evaluated by A.C. Disagreements about quality ratings were resolved and revised through the raters' discussion and re-consultation with the checklist and accompanying manual. Based on Cohen's Kappa, inter-rater agreement over study quality of the subset sample ($n=10$) was 0.49, indicating moderate strength in agreement about study quality (McHugh, 2012).

Data Extraction and Synthesis Methods

Results of eligible studies were assessed to determine if they provided data sufficient for conducting a meta-analysis. This was done by grouping studies according to statistical and methodological heterogeneity. Attempts to group studies in this way highlighted issues with insufficient data to calculate standardised effect sizes. This meant that use of meta-analysis may have risked the under-representation of accurate and reliable findings (Thompson, 1994). An alternative approach was considered whereby dependent effect sizes would be treated as independent. However, this method can inflate the variance of the mean effect size and risk introducing bias through giving studies with greater effect sizes more weight in the meta-analysis (Scammacca et al., 2014). For this reason, a meta-analysis was not performed.

The results of included studies were instead narratively synthesised and reported according to the Synthesis Without Meta-analysis (SWiM; Campbell et al., 2020) guideline (Appendix E). SWiM was developed to address the issue of transparency in the reporting of reviews using narrative synthesis without meta-analysis. The guideline supports reviewers to ensure clear reporting of synthesis methods, overall conclusions and limitations relating to systematic review of studies that have used different outcome measures; have high clinical or methodological heterogeneity or, when results data is not available in a suitable format for meta-analysis (Campbell et al., 2020).

The reviewer consulted with a research supervisor to inform an adaptation of the SWiM guidance that was made due to the insufficient data that negated the need for statistical analysis

steps (Popay et al. 2006). To facilitate exploration of differences among variables, key findings and limitations, the guideline recommends grouping studies based on a common design characteristic (McKenzie & Brennan, 2024). Studies were hence organised for synthesis by grouping them according to homogeneous operationalisation of CF. This enabled direct comparisons of studies exploring specific types of CF, for example ‘thought-shape fusion’ and ‘body image-related CF’. The key findings of the included studies were synthesised through comprehensive assessment and iterative revisitation of results, conclusions and discussion sections of the included papers. Findings were summarised into a table (Table 3). An inductive approach to the identification of patterns in the results that grouped findings thematically was taken. Data was explored and interpreted without a pre-defined theory or hypothesis about what it might reveal.

Results

Study selection, characteristics and quality

After removing $n=823$ duplicates from the $n=2753$ papers yielded from initial searches, $n=1930$ remained for title and abstract screening. Title and abstract screening was completed by S.J and a random sample ($n=193$) of these were screened by A.C. A total of $n=1780$ papers were removed and $n=150$ papers were retained for full text review. A final total of $n=31$ studies were included in the review, $n=3$ (Stefani, 2018; Upton, 2020; White, 2018) were unpublished theses manuscripts and $n=28$ were peer-reviewed journal articles. Table 3 orders studies according to consistencies in CF measures (Campbell et al., 2020) and in accordance with SWiM, provides an overview of study design, sample characteristics, measures and findings.

The included studies contained an uneven mix of clinical ED and non-clinical samples identifying as female ($n=6094$), male ($n=1409$) and transgender or non-binary ($n=20$). These totals exclude samples used by two studies (Sternheim et al., 2022; Thompson & Martin-Wagar, 2024) which did not report the gender of participants. Most studies had a cross-sectional ($n=21$, 68%) design with some experimental ($n=7$, 22%) and quasi-experimental ($n=3$, 10%). The most consistent measure of eating-related difficulty used by the included studies was the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn et al., 2008) (45.1%) and the most common measure of CF was the Thought-Shape Fusion Scale (TSF scale; Shafran et al., 1999) (25.8%). A total of 13 different measures of CF and seven different assessments of eating-related difficulties were used overall (Appendix F). There were four studies that used both the EDE-Q and the TSF-scales, but these differed in other methodology including sample characteristics and data analysis.

The most common reason attributed to poorer study quality fell on lower scores on items 11 and 12 of the Quallsyst tool (Table 4; Appendix D). This reflected some of the studies included achieving insufficient power, or inattention towards the reporting of information regarding variance

estimates. It also highlighted that a large quantity of included cross-sectional studies did not address issues associated with partial or incomplete controlling of confounding variables.

Synthesis results

Data is presented narratively according to nine themes: (a) emotional state (b) shame (c) relevant demographic confounders (d) coping strategies (e) eating habits (f) personality and individual differences (g) perceptions or nature of symptoms (h) body image and (i) sociocultural context. The findings relevant to the review's aims of the $n=31$ included studies are summarised in Table 3. Table 5 describes the grouping of studies according to the factors that emerged from analysis.

Table 3*Characteristics and findings of (n=31) included studies organised according to CF measures*

#	Author(s) publication year and country	Study Design	Sample Characteristics	Measure of CF	Measure of eating- related difficulties	Findings
8	Klein et al. (2022) Florida, US	Experimental	N=90 females with and without emotional eating difficulties non-clinical	WSAP ² VAS ³	EES ⁴	Emotional eating behaviours increase when negative affect is high. There is an association between explicit shame biases and increased food consumption for ‘emotional eaters.’
17	Sairanen et al. (2015) Finland	Correlational, Survey (cross- sectional)	N=48 males N=248 females with an overweight or obese BMI non-clinical	AAQ-II ⁵ FFMQ ⁶	AAQW ⁷ IES ⁸	People with a lower [but still overweight] BMI eat more intuitively and have less shape and weight concern. Psychological flexibility and mindfulness are related and are positively associated with intuitive eating. ‘Non-judgements’ can explain the relationship between psychological flexibility and unconditional permission to eat. Mindfulness skills mediate the relationship between psychological flexibility and regulating eating behaviour.

² A modified Word Sentence Association Paradigm (WSAP; Amir & Taylor, 2012)³ Visual Analogue Scales (Rolls et al., 1992)⁴ Emotional Eating Scale (EES; Arnow et al., 1995)⁵ Acceptance and Action Questionnaire-II (Bond et al., 2011)⁶ Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006)⁷ Acceptance and Action Questionnaire for Weight (AAQW; Lillis & Hayes, 2008)⁸ Intuitive Eating Scale (IES; Tylka, 2006)

#	Author(s) publication year and country	Study Design	Sample Characteristics	Measure of CF	Measure of eating- related difficulties	Findings
21	Stefani (2018) Virginia, US	Correlational, Survey (cross- sectional)	N=84 females N=23 males non-clinical	AAQ-II MASS ⁹	EAT-26 ¹⁰	Hope, mindfulness and internal locus of control can predict cognitive and psychological flexibility. There is no association between spirituality or religiosity and ED symptomology through CF, though individuals with a religious and/or spiritual outlook may exhibit greater psychological flexibility.
29	White (2018) Colombia	Correlational, Survey (cross- sectional)	N=4 males N=2 transgender N=175 females clinical population (informal/formal ED diagnosis)	AAQ ¹¹	EDE-Q ¹²	Psychological flexibility and self-concealment may combine to increase the severity of disordered eating behaviour. Psychological inflexibility increases the severity of disordered eating symptoms. Engagement with treatment for an ED also significantly influences relationships between psychological flexibility and severity.
16	Rudiger & Winstead, (2013) Virginia, US	Correlational, Survey (cross- sectional)	N=203 females non-clinical	Adapted CRQ ¹³ ABCD ¹⁴	BASS ¹⁵ EAT-26	There is a negative relationship between self-accepting and positive body talk and body-related cognitive distortions. There is a positive relationship between body satisfaction, self-esteem and friendship quality.

⁹ Mindful Attention and Awareness Scale (Brown & Ryan, 2003)

¹⁰ Eating Attitudes Test-26 (EAT-26; Garner et al., 1982)

¹¹ Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004)

¹² The Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994, 2008)

¹³ Co-rumination Questionnaire (Rose, 2002)

¹⁴ Assessment of Body Image Cognitive Distortions (ABCD, Jakatdar et al., 2006)

¹⁵ The Body Areas Satisfaction Scale (BASS; Cash, 2000)

#	Author(s) publication year and country	Study Design	Sample Characteristics	Measure of CF	Measure of eating- related difficulties	Findings
27	Wendell et al. (2012) Georgia, US	Correlational, Survey (cross- sectional)	N=208 (study 1 – 164 females, 44 males) N= 178 (study 2 – 112 females, 66 males) non-clinical	BI-AAQ ¹⁶	MAC-R ¹⁷ EDE-Q	The link between disordered eating cognitions and overall disordered eating pathology is established in part through an inflexible and avoidant coping style relating to low body image; after controlling for gender and BMI.
10	Mendes et al. (2022) Portugal	Correlational, Survey (cross- sectional)	N=776 females non-clinical	BI-AAQ	EDE-Q	Body image inflexibility mediates the relationship between external shame and disordered eating. It also mediates the relationship between unfavourable social comparisons and disordered eating.
18	Scardera et al. (2020) Canada	Correlational, Survey (cross- sectional) and Experimental research	N=46 females N=5 males non-clinical population	CFQ-BI ¹⁸	DEQ ¹⁹	Body image-related CF is a phenomenon independent of mood state. Females experience higher body-image CF than males. Self-compassion is a strong predictor of body image-related CF.

¹⁶ Body-Image Acceptance and Action Questionnaire (BI-AAQ; Ferreira et al., 2011)

¹⁷ The Mizes Anorectic Cognitions Questionnaire-Revised (MAC-R; Mizes et al., 2000)

¹⁸ CF Questionnaire-Body Image (CFQ-BI; Gillanders et al., 2014)

¹⁹ Disordered Eating Questionnaire (DEQ; Lombardo et al., 2011)

#	Author(s) publication year and country	Study Design	Sample Characteristics	Measure of CF	Measure of eating- related difficulties	Findings
6	Duarte & Pinto-Gouveia. (2017) Portugal	Correlational, Survey (cross-sectional)	N=114 females clinical (BED diagnosis)	CFQ-BI	EDE ²⁰ BISS ²¹ BES ²²	There is an association between experiences of 'current' shame with body image-related CF which is predictive of increased binge eating. Body image-related CF mediates the effect of external body shame and external shame on binge-eating symptoms. Early 'weight and body image teasing experiences' are noteworthy in these associations.
2	Bento et al. (2017) Portugal	Correlational, Survey (cross-sectional)	N=369 females non-clinical	CFQ-BI	EDE-Q	The impact of negative body image evaluation in disordered eating is partially carried by higher body image-related CF. Body image-related CF is negatively and strongly associated with body appreciation. There is a positive, moderate relationship between body image discrepancy and body image-related CF. Females who perceive their body as significantly discrepant from the socially idealized thin ideal show tendencies to engage in disordered eating behaviour.
9	Melo et al. (2020) Portugal	Correlational, Survey (cross-sectional)	N=144 males N=643 females non-clinical	CFQ-BI	BES	CF mediates the relationship between body image-related shame and binge eating severity. External shame experiences (perceptions of existing negatively in the minds of others), when associated with body image-related shame and CF, increase binge eating symptomology.
25	Trindade et al. (2015) Portugal	Correlational, Survey (cross-sectional)	N=659 females non-clinical	CFQ-BI	IEQ ²³	Body image-related CF mediates the effects of weight dissatisfaction and shame on inflexible adherence to eating rules.

²⁰ ED examination (EDE; Fairburn et al., 2008)

²¹ Body image shame scale (BISS; Duarte et al., 2015c)

²² Binge eating scale (BES; Gormally et al., 1982)

²³ Inflexible Eating Questionnaire (IEQ; Duarte et al., 2017)

#	Author(s) publication year and country	Study Design	Sample Characteristics	Measure of CF	Measure of eating- related difficulties	Findings
24	Thompson & Martin-Wagar (2024) Montana, US	Correlational, Survey (cross-sectional)	N=227 mixed gender (missing data) transdiagnostic ED population with comorbid PTSD/GAD	CFI ²⁴	No direct measure	Differences in cognitive flexibility between ED patients with and without comorbidities (PTSD or GAD) can be explained by emotion regulation. Cognitive flexibility is significantly lower in adults with a comorbid ED and GAD and/or PTSD presentation.
12	Miles et al. (2023) Australia	Correlational, Survey (cross-sectional)	N=42 females non-clinical and clinical mix n=15 current AN diagnosis n=12 past AN diagnosis n=15 healthy controls	CFI	EDE-Q RRS-ED ²⁵	Performance on neurocognitive tasks is similar across groups of people with and without a lifetime diagnosis of AN, despite AN individuals self-reporting lower cognitive flexibility. Eating-disorder specific rumination and perfectionism mediates the relationship between cognitive flexibility and ED symptoms.
22	Sternheim et al. (2022) Holland	Quasi-experimental	N=200 Mixed gender population (missing data) n=61 patients with AN n=72 patients with OCD n=67 healthy controls	DFLEX ²⁶	EDE-Q	Duration of illness in people with AN contributes to poorer set-shifting (and possibly cognitive flexibility) when compared to healthy controls. There is an association between cognitive inflexibility and greater symptom severity.

²⁴ Cognitive Flexibility Inventory (CFI; Dennis & Vander Wal., 2010)

²⁵ Ruminative Response Scale for EDs (RRS-ED; Cowdrey & Park, 2011)

²⁶ Detail and Flexibility Questionnaire (DFLEX; Robertset al., 2011)

#	Author(s) publication year and country	Study Design	Sample Characteristics	Measure of CF	Measure of eating- related difficulties	Findings
5	Dann et al. (2023) Australia	Correlational, Survey (cross- sectional)	N=97 females clinical (self- reported current or past AN)	EDFLIX ²⁷	EDE-Q	There is an interaction between cognitive-behavioural flexibility and emotion regulation. Weight recovery in EDs may be associated with psychological flexibility and frequent use of cognitive reappraisal strategies.
1	Barnes et al. (2013) Connecticut, US	Correlational, Survey (cross- sectional)	N=40 males N=110 females non-clinical Overweight or obese BMI seeking help for binge- eating	FTSI ²⁸	QEWP-R ²⁹	There is no association between food-thought suppression and BMI in an obese population seeking treatment for binge eating. Higher food-thought suppression is related to increased concerns about weight and eating; and overall ED psychopathology. In males, there is a significant relationship between amount of time spent dieting in adult life and food-thought suppression.
28	Wetzel & Himmelstein (2023) Ohio, US	Correlational, Survey (cross- sectional)	N=515 females N=490 males (clinical/non-clinical - not clearly defined)	WBIS-M ³⁰	Project EAAT survey ³¹ Coping subscale of the MES ³²	Race moderates the relationship between weight stigma and body-vigilance.

²⁷ Eating Disorder Flexibility Index (EDFLIX; Dahlgren et al., 2019)

²⁸ Food Thought Suppression Inventory (FTSI; Barnes & White, 2010)

²⁹ Questionnaire for Eating and Weight Patterns-Revised (QEWP-R; Spitzer et al., 1993)

³⁰ Modified Weight Bias Interpretation Scale (WBIS-M; Pearl & Puhl, 2014)

³¹ Eating And Activity over Time Survey (Larson et al., 2011)

³² Motivation to Eat Scale MES (Jackson et al., 2003)

#	Author(s) publication year and country	Study Design	Sample Characteristics	Measure of CF	Measure of eating- related difficulties	Findings
26	Upton (2020) Louisiana, US	Correlational, Survey (cross- sectional)	N=548 males N=535 females N=18 transgender or non-binary (clinical/non-clinical – not clearly defined)	MPFI ³³	No direct measure	Cognitive defusion is a significant predictor of decreased impulsive binge eating, possibly through it reducing ‘risk attitude’.
23	Tchanturia et al. (2011) UK	Experimental	N=601 females n=385 ED diagnosis n=216 healthy controls clinical/non-clinical mix	BSAT ³⁴	No direct measure	Cognitive inflexibility has a ‘trait’ nature in those with AN independent of BMI. Individuals who have recovered from AN (and have a BMI >18.5, restored menstruation and an absence of ED behaviours) did not differ in cognitive flexibility from those with acute AN.
31	Wyssen et al. (2019) Switzerland	Experimental – using ecological momentary assessment	N=51 females non-clinical population	TSF-BT ³⁵	EDE-Q	Exposure to thin ideas increases experiences of body-related TSF. High body-related TSF is associated with higher self-ideal discrepancy and more pronounced disordered eating.
30	Wyssen et al. (2016) Switzerland	True Experimental	N=91 females non-clinical	TSF-B ³⁶	EDE-Q	Imagining thin-ideals initiates body-related cognitive distortions.

³³ Multidimensional Psychological Flexibility Inventory (MPFI; Rolffs, Rogge & Wilson, 2016)

³⁴ The Brixton Spatial Anticipation Test (Burgess & Shallice, 1997)

³⁵ Thought Shape Fusion Body Trait Questionnaire (TSF-B; Wyssen et al., 2017)

³⁶ Thought-Shape Fusion Body State Scale (TSF-B; adapted from Radomsky et al., 2002 & Coelho et al., 2008)

#	Author(s) publication year and country	Study Design	Sample Characteristics	Measure of CF	Measure of eating- related difficulties	Findings
3	Coelho et al. (2010) Holland	Experimental	N=72 females non-clinical	TSF-Q ³⁷	RS ³⁸	High negative affect increases vulnerability to experiences of TSF.
7	Jauregui- Lobera et al. (2012) Spain	Correlational, Survey (cross- sectional)	N=69 females N=7 males clinical population	TSF-Q	EDI-2 ³⁹	There is a significant relationship between body-image quality of life and TSF-interpretative.
20	Shafran & Robinson (2004) Canada	Correlational, Survey (cross- sectional)	N=42 females clinical/non-clinical mix	TSF-Q	EDE-Q BCAQ ⁴⁰	The association between TSF and body-checking is not significant when mood is controlled for. The relationship between 'interpretation' TSF and BMI is no longer significant when controlling for depression. There is an overall strong association between the severity of ED psychopathology and the degree of TSF.
19	Shafran et al. (1999) Canada	Correlational, Survey (cross- sectional) and Experimental	N=91 females N=27 males non-clinical	TSF-Q TAF scale	EDs examination- questionnaire (EDE-Q; Fairburn & Beglin, 1994)	There is an association between TSF responses and ED psychopathology, but the relationship is not mediated by depression.

³⁷ Thought-shape fusion questionnaire (TSF-Q; Shafran et al., 1999)

³⁸ Restraint scale (Polivy, Herman, & Howard, 1988)

³⁹ Eating Disorder Inventory-II (EDI-2; Garner, 1991)

⁴⁰ Body checking and avoidance questionnaire (Shafran et al., 2004)

#	Author(s) publication year and country	Study Design	Sample Characteristics	Measure of CF	Measure of eating- related difficulties	Findings
4	Dubois et al. (2016) Australia	Correlational, Survey (cross- sectional)	N=167 females N=31 males non-clinical	TSF-Q	EDE-Q BAS ⁴¹	Levels of TSF is higher in females than males. For females, TSF Concept and TSF Interpretation were significantly positively associated with eating disorder behaviours and were significantly negatively associated with levels of body image.
14	Ouellet- Courtois et al. (2015) Canada	Experimental	N=2 males N=30 females clinical	TSF-Q TTPR ⁴²	EDE-Q	People with high 'trait' TSF are more likely to experience high 'state' TSF, which can endorse disordered eating thoughts in response to everyday experiences.
15	Radomsky et al. (2002) UK	Experimental	N=20 Clinical (AN)	TSF-Q TAF ⁴³	Response ratings to experimental questions	There is a significant relationship between levels of TSF and depression scores.
13	Mora- Maltas et al. (2023) Spain	Quasi- Experimental	N=130 females N=31 males clinical	WCST ⁴⁴	Drive for Thinness (DT) of EDI-II ⁴⁵	There are significant differences in cognitive performances of AN patients classified as 'mild', 'moderate' or 'severe'. Binge-eating disorder patients classified as 'mild' show a higher percentage of cognitive flexibility. A longer illness duration is associated with greater deficits in cognitive flexibility.
11	Miles et al. (2022) Australia	Quasi- experimental	N=206 females N=56 males from Clinical/non-clinical mix	WCST CFI	EDE-Q	Individuals with a lifetime diagnosis of AN (and categorised as 'higher risk') self-report significantly poorer cognitive flexibility than lower-risk group categories. However, their performance on cognitive tasks was similar to non-clinical and lower risk groups.

⁴¹ Body Appreciation Scale (BAS; Avalos et al., 2005)

⁴² Target Thought Priming Ratings (TTPR; (adapted from Purdon et al., 2011)

⁴³ Thought Action Fusion scale (TAF scale; Shafran et al., 1996)

⁴⁴ Wisconsin Card Sorting Test (WCST; Heaton, 1993)

⁴⁵ Eating Disorder Inventory II (EDI-II; Garner, 1991)

Table 4*Quality ratings of papers according to QualSyst items (Kmet et al., 2004)*

#	Paper	Checklist Item No. and Score ^[1]														T ^[2]	S ^[3]
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		
1	Barnes et al. (2013)	2	2	1	2	NA	NA	NA	2	0	2	0	1	2	2	16	73%
2	Bento et al. (2017)	2	1	1	2	2	2	2	2	2	2	2	1	2	2	25	89%
3	Coelho et al. (2010)	2	2	1	2	1	0	2	2	0	2	2	2	2	2	22	79%
4	Dubois et al. (2016)	2	2	1	2	NA	NA	2	2	2	2	1	1	2	2	21	88%
5	Dann et al. (2022)	1	1	0	2	NA	NA	NA	2	2	2	2	1	2	2	17	77%
6	Duarte & Pinto-Gouveia (2017)	2	2	2	2	NA	NA	NA	2	2	2	2	1	2	2	21	95%
7	Jauregui-Lobera et al. (2012)	2	2	2	2	NA	NA	NA	2	2	2	2	2	2	2	22	100%
8	Klein et al. (2022)	2	2	2	2	NA	NA	NA	2	2	2	2	1	2	2	21	95%
9	Melo et al. (2020)	2	2	2	2	NA	NA	NA	2	2	2	0	1	2	2	19	86%
10	Mendes et al. (2022)	2	2	2	2	NA	NA	NA	2	2	2	2	1	2	2	21	95%
11	Miles et al. (2022)	2	2	2	2	1	NA	NA	2	1	2	2	0	2	2	20	83%
12	Miles et al. (2023)	2	2	2	2	NA	NA	NA	2	0	2	1	1	2	1	17	77%
13	Mora-Maltas et al. (2023)	2	2	2	2	NA	NA	NA	2	1	2	2	1	2	2	20	91%
14	Ouellet-Courtois et al. (2015)	2	2	2	2	2	2	2	2	1	2	2	1	2	2	26	93%
15	Radomsky et al. (2002)	2	2	2	2	NA	NA	NA	2	1	2	1	1	2	2	19	86%
16	Rudiger & Winstead (2013)	2	2	2	2	2	2	2	2	2	2	2	1	2	2	27	96%
17	Sairanen et al. (2015)	2	2	2	2	NA	NA	NA	2	2	2	2	1	2	2	21	95%
18	Scardera et al. (2020)	2	2	2	2	NA	NA	NA	2	2	2	2	1	2	2	21	95%
19	Shafran et al. (1999)	2	2	2	2	NA	NA	NA	2	2	1	1	1	2	2	19	86%
20	Shafran & Robinson (2004)	2	2	2	2	NA	NA	NA	2	2	1	1	1	2	2	19	86%
21	Stefani (2018)	2	2	2	2	NA	NA	NA	2	1	2	2	1	2	2	20	91%
22	Sternheim et al. (2022)	2	2	2	2	NA	NA	NA	2	2	1	2	1	2	2	20	91%
23	Tchanturia et al. (2011)	2	2	2	1	NA	NA	NA	2	2	2	2	2	2	2	20	95%
24	Thompson & Martin-Wagar (2024)	2	2	2	2	NA	NA	NA	2	2	2	1	1	2	2	20	91%
25	Trindade et al. (2015)	2	2	2	2	NA	NA	NA	2	2	1	1	1	2	2	19	86%
26	Upton (2020)	2	2	2	2	NA	NA	NA	1	1	1	2	1	2	2	18	82%
27	Wendell et al. (2012)	2	2	2	2	NA	NA	NA	1	1	1	1	1	2	2	17	77%
28	Wetzel & Himmelstein (2023)	2	2	2	2	NA	NA	NA	2	2	2	2	1	2	2	21	95%
29	White (2018)	2	2	2	2	NA	NA	NA	2	2	2	2	1	2	2	21	95%
30	Wyssen et al. (2016)	2	2	2	2	2	NA	NA	2	2	2	2	1	2	2	21	95%
31	Wyssen et al. (2019)	2	2	2	2	NA	NA	NA	2	1	2	2	1	2	2	20	91%

^[1] 0 = No, 1 = Partial, 2 = Yes, NA = Not applicable to study design (awarded 0 when calculating S)^[2] Total Score = Sum of items 1-14^[3] Summary Score = T / (No. of items scored x 2)

Table 5*Grouping of studies according to emerging factors*

#		Emotional state	Shame	Relevant demographic confounders	Coping strategies	Eating habits	Personality and individual differences	Perceptions or nature of symptoms	Body image	Sociocultural context
1	Barnes et al. (2013)			✓	✓	✓				
2	Bento et al. (2017)								✓	✓
3	Coelho et al. (2010)	✓								
4	Dubois et al. (2016)			✓					✓	
5	Dann et al. (2023)				✓					
6	Duarte & Pinto-Gouveia (2017)		✓						✓	
7	Jauregui-Lobera et al. (2012)								✓	
8	Klein et al. (2022)	✓	✓							
9	Melo et al. (2020)		✓						✓	
10	Mendes et al. (2022)		✓							✓
11	Miles et al. (2022)							✓		
12	Miles et al. (2023)						✓			
13	Mora-Maltas et al. (2023)							✓		
14	Ouellet-Courtois et al. (2015)						✓			
15	Radomsky et al. (2002)	✓								
16	Rudiger & Winstead (2013)				✓					
17	Sairanen et al. (2015)			✓	✓	✓				
18	Scardera et al. (2020)	✓		✓	✓					
19	Shafran et al. (1999)	✓								
20	Shafran & Robinson (2004)	✓						✓		
21	Stefani (2018)				✓		✓			✓

22	Sternheim et al. (2022)					✓	✓		
23	Tchanturia et al. (2011)		✓					✓	
24	Thompson & Martin-Wagar (2024)			✓				✓	
25	Trindade et al. (2015)	✓							
26	Upton (2020)					✓			
27	Wendell et al. (2012)			✓					
28	Wetzel & Himmelstein (2023)		✓						
29	White (2018)	✓						✓	
30	Wyssen et al. (2016)								✓
31	Wyssen et al. (2019)								✓
Total		6	6	6	8	2	5	7	5

Emotional state.

Six papers (Coelho et al., 2010; Klein et al., 2022; Radomsky et al., 2002; Scardera et al., 2020; Shafran et al., 1999; Shafran & Robinson, 2004) examined the relationship between TSF and mood state and affect. Of these, four (Coelho, Roefs & Jansen, 2010; Klein et al., 2022; Radomsky et al., 2002; Shafran & Robinson, 2004) suggested that negative affect or low mood was associated with greater TSF and two studies (Scardera et al., 2020; Shafran et al., 1999) found no relationship. Efforts to reduce TSF through neutralization behaviours reduced experiences of anxiety, guilt, and feelings of fatness. This indicates links between behavioural responses to TSF and emotional state.

Shame.

Six papers (Duarte & Pinto-Gouveia, 2017; Klein et al., 2022; Melo et al., 2020; Mendes et al., 2022; Trindade et al., 2015; White, 2018) discussed the role of shame or shame-related behaviours such as self-concealment. Body image-related CF and psychological inflexibility had a mediating effect between shame and disordered eating behaviour, including inflexible adherence to eating rules (Mendes et al., 2022; Melo et al., 2020; Trindade et al., 2015) and binge eating (Duarte & Pinto-Gouveia, 2017). Moreover, self-concealment, a behavioural tendency linked to experiences of shame (Larson & Chastain, 1990), was associated with a higher risk of psychological inflexibility which when combined, appeared to increase the severity of disordered eating behaviours (White, 2018). In Klein et al.'s (2022) study, emotional eaters had a greater number of shame-oriented biases.

Relevant demographic confounders.

Six papers (Barnes et al., 2013; Dubois et al., 2016; Sairanen et al., 2015; Scardera et al., 2020; Tchanturia et al., 2011; Wetzel & Himmelstein, 2023) were grouped based on their exploration of factors that are arguably relevant to weight, shape or size. Higher rates of CF in eating-related difficulties were associated with gender (Dubois et al., 2016; Scardera et al., 2020), race (Wetzel & Himmelstein, 2023) and age (Tchanturia et al., 2011). Females were more likely to fuse body or food-related thoughts with weight and shape change than males (Dubois et al., 2016). Findings on associations of Body Mass Index (BMI) to experiences of CF in EDs were mixed. In overweight adults, lower BMI was associated with intuitive eating and psychological flexibility could account for this variance in one study (Sairanen et al., 2015), whilst Barnes et al. (2013) found no association between BMI and food-thought suppression in their study of overweight adults.

Coping strategies.

Eight studies (Barnes et al., 2013; Dann et al., 2023; Rudiger & Winstead, 2013; Sairanen et al., 2015; Scardera et al., 2020; Stefani, 2018; Thompson & Martin-Wagar 2024; Wendell et al., 2012) explored distress tolerance, emotion regulation or coping strategies in relationships between CF and eating-related difficulties. Self-compassion, mindfulness and acceptance-based approaches were linked with decreased body image-related cognitive fusion and intuitive eating in both clinical and non-clinical samples (Sairanen et al., 2015; Scardera et al., 2020; Stefani, 2018; Rudiger & Winstead, 2013). Interaction effects were observed between emotion regulation and psychological flexibility which increased the complexity and severity of some eating difficulties. For example, Thompson & Martin-Wagar (2024) found that differences in cognitive flexibility between ED patients with and without co-occurring anxiety disorders could be explained by poorer emotion regulation capability. This is congruent with Dann et al. (2023) who found a positive association between emotion regulation and psychological flexibility on BMI; thus potentially weight-restoration in those with an anorexia diagnosis. Lastly, in a non-clinical population of undergraduates, Wendell et al. (2012) found body image inflexibility and avoidant coping styles specific to negative body image could explain the relationship between disordered eating cognitions and ED psychopathology.

Eating habits.

Two studies (Barnes et al. 2013; Sairanen et al., 2015) explored the role of eating or related food habits in relationships between CF and ED psychopathology. Significant relationships were found between time spent dieting in adult life and levels of food-thought suppression (Barnes et al., 2013). Psychological flexibility was linked with intuitive eating, including allowing oneself unconditional permission to eat and eating regularly (Sairanen et al., 2015).

Personality and individual differences.

Five studies (Miles et al., 2023; Ouellet-Courtois et al., 2015; Stefani, 2018; Sternheim et al., 2022; Upton, 2020) described associations between CF, eating-related difficulties and nuances in personality or individual differences. Individual differences represent patterns of thought, feeling, and behaviour that generally persist across an individual's life span (Costa & McCrae, 1999). Miles et al. (2023) found that tendencies to ruminate and perfectionism mediated the relationship between CF and ED symptoms, whilst Shafran & Robinson (2004) found high 'trait' TSF, characterised as an enduring cognitive style of experiencing TSF-related thoughts, was linked with increased vulnerability to temporary 'state' TSF. Both were significantly associated with ED psychopathology (Ouellet-Courtois et al., 2015). Upton's (2020) study found psychological flexibility-related 'cognitive defusion' skills predicted decreased impulsive eating whilst inaction and lack of contact with values increased impulsive eating. These findings may infer that psychological inflexibility is involved with binge-eating behaviours.

Perceptions or nature of symptoms.

Seven studies (Miles et al., 2022; Mora-Maltas et al., 2023; Shafran & Robinson, 2004; Sternheim et al., 2022; Tchanturia et al., 2011; Thompson & Martin-Wagar, 2024; White, 2018) explored associations between CF and eating-related difficulties and perceptions or nature of symptoms. Individuals considered 'high-risk' or with more severe and enduring manifestations of eating difficulties self-reported poorer cognitive flexibility (Miles et al., 2022; Shafran & Robinson, 2004; Sternheim et al., 2022; White, 2018). Participants determined as 'high-risk' of AN perceive themselves to have higher cognitive inflexibility compared to those determined as 'lower risk' of AN (Miles et al., 2022). Whilst binge-eating spectrum patients with longer illness duration showed greater deficits in cognitive flexibility than patients with shorter duration (Mora-Maltas et al., 2023). Individuals recovered from AN did not differ significantly in cognitive flexibility from those with acute AN (Tchanturia et al., 2011). Illness complexity in the form of cooccurrence with an anxiety disorder was associated with reduced cognitive flexibility in individuals with EDs (Thompson & Martin-Wagar, 2024).

Body image.

Five studies (Bento et al., 2017; Dubois et al., 2016; Duarte & Pinto-Gouveia, 2017; Jauregui-Lobera et al., 2012; Melo et al., 2020) described strong negative associations between the construct of body-image, body appreciation and experiences of CF in eating-related difficulties (Bento et al., 2017; Dubois et al., 2016; Duarte & Pinto-Gouveia, 2017; Jauregui-Lobera et al., 2012; Melo et al., 2020). Dubois et al (2016) found that for females, TSF Concept and TSF Interpretation were

significantly positively associated with ED behaviours and significantly negatively associated with levels of body image. CF was found to mediate the relationship between low body-image and eating-related difficulties (Melo et al., 2020).

Sociocultural context.

Five studies (Bento et al., 2017; Mendes et al., 2022; Stefani, 2018; Wyssen et al., 2016; Wyssen et al., 2019) explored areas encompassing sociocultural context in associations between CF and eating-related difficulties. ‘Sociocultural context’ refers to attitudes, behaviours, and values in society that are linked to population, lifestyle, culture or traditions. Body image-related CF was strongly associated with discrepancies in body image resulting from perception of one’s body as incongruous with socially constructed ‘thin ideals’ (Bento et al., 2017; Wyssen et al., 2016; Wyssen et al.’s 2019). Body-image inflexibility mediated the relationship between unfavourable social comparisons and disordered eating behaviours (Mendes et al., 2022). Findings on spirituality suggested that a religious or spiritual outlook may increase psychological flexibility, but with no association to reduced ED psychopathology (Stefani, 2018).

Discussion

This systematic review aimed to identify factors associated with CF in eating-related difficulties and whether these influence internal experiences of one’s body, shape or weight. The objective was to understand how clinicians may enhance cognitive defusion interventions that aim to address eating-related difficulties. Overall, the review supports findings on the role of CF in relationships between body-image and eating-related difficulties (Trindade & Ferreira, 2014); and the efficacy of ACT-based, cognitive control strategies such as thought reframing and mental distraction that target unpleasant CF-related experiences (Di Sante et al., 2022).

Main findings

Results identified nine factors representing themes in findings across the $n=31$ included studies exploring CF and eating-related difficulty variables. These were: emotional state, shame, relevant demographic confounders, coping strategies, eating habits, personality and individual differences, perceptions or nature of symptoms, body image and sociocultural context.

There was consistent evidence that interpretations of low body-image and shame strengthen relationships between CF and eating-related difficulties. This finding supports integrative cognitive-behavioural models of EDs which posit ‘body self-schema’ as a significant driver of the cognitive processes underlying their psychopathology. Pre-occupation with shape or weight can result in body self-schema that result in biases or negative judgement about one’s shape, size or weight when interpreting body- and or food-related stimuli. For example, feelings of fullness may be interpreted as “feeling fat” (Williamson et al., 2004; Fairburn et al., 2003). Findings on shame, personality and

copied skills correspond with the maintaining processes of clinical perfectionism, low self-esteem and mood intolerance also highlighted by integrative models (Fairburn et al., 2003). For example, the mediating effect of body image-related CF in shame experiences and ED psychopathology indicate that it may be the process of how one relates their shaming experiences to their experience of shame memories that influences eating difficulties. This is a process that may also be associated with the development of negative body self-schema (Williamson et al. 2000).

Links between perfectionism and cognitive inflexibility in ED psychopathology may be interpreted through perfectionism increasing propensity to rigid shape, weight or eating-related rules (Boone, Claes, & Luyten, 2014). Perceptions of oneself as cognitively rigid (Miles et al., 2022) or needing to be 'perfect' may compound this relationship, that fuels further CF with thoughts that support efforts to control eating, shape or weight (Miles et al., 2022).

The relevance of perceptions or nature of symptoms or their severity to experiences of CF in eating-related difficulties was less clear. However, results that indicated a discrepancy between self-perceived and objectively assessed cognitive flexibility (Miles et al., 2022) offer insight into how cognitive defusion techniques may be appraised by individuals with an ED. For instance, 'higher risk' ED patients perceiving themselves as more cognitively inflexible than their objective assessment may reflect constructions of a rigid and entrenched 'illness' identity where one may define their characteristics by the symptoms of their disorder (Croce et al., 2024; Tekin, 2011). This may highlight a possible role for future research to explore connections between CF and ED-related illness identity.

The relevance of emotional state may reflect that maladaptive behaviours resulting from TSF are harder to resist under conditions of low mood (Shafran & Robinson, 2004). CF with negative thoughts about appearance may increase when pre-existing depressive symptoms are already attenuating focus on aspects of the self that one dislikes (Beck, 2002). Similarly, negative evaluation of thoughts activated by depression can trigger disordered eating episodes; which lead to further experiences of guilt or shame and ultimately, deterioration in mood and self-esteem (Burton & Abbot, 2019; Close, 2013; Fairburn, 1997).

Findings on 'non-judgement' in the relationship between CF and granting oneself unconditional permission to eat support other findings on higher body image-related CF predicting decreases in unconditional permission to eat, and this effect subsequently predicting higher ED symptom severity (Barney et al., 2022). Through the harnessing of an objective or "emotionally neutral" stance towards one's food-related attitudes and behaviour (such as unconditional permission to eat), rationale for cognitive defusion techniques in EDs is supported (Harris, 2009). Individuals who experience higher body image-related CF may overidentify with beliefs they hold about certain foods having a detrimental impact on their shape or body, such as "carbohydrates make you fat". This also relates to the theme of sociocultural context as food and diet-related meanings that are drawn from exposure to the messages of contemporary diet culture, often

conveyed through social media have been linked with increases in phenomena such as ‘orthorexia’ (Ayguasanosa Ávila, 2022; Atherton, 2021; Scheiber et al., 2023). Diet, weight and shape-related messages and norms derived through these mediums are also linked with body-image. Social messages that associate physical appearance with desirable psychological characteristics such as power, success and happiness has led to the inflated focus of many Western societies’ on physical appearance as a marker of success (Durvasula & Lysonski, 2008; Swami, 2015).

Strengths, limitations and implications

Strengths

This systematic review offers a valuable synthesis and clarification of how emotional processes, particularly shame, guilt, and negative mood interact with CF to maintain eating-related problems. For example, it offers novel insight into the role of negative affect in increasing CF, making appearance or food-related thoughts harder to diffuse from and increasing susceptibility to disordered eating episodes (Coelho et al., 2010; Klein et al., 2022). These findings support integrative cognitive-behavioural models of EDs (Fairburn et al., 2003) which pinpoint mood intolerance and self-evaluative concerns as perpetuating mechanisms.

These findings may also support the rationale for ACT-based interventions, particularly cognitive defusion techniques which target how individuals relate to shame and guilt-related thoughts, rather than directly challenging their content (Hayes et al., 2006; Harris, 2009). The synthesis also sets these processes within a sociocultural context, noting that exposure to thin ideals and diet culture may amplify CF by reinforcing body dissatisfaction and heightening vulnerability to shame (Bento et al., 2017; Wyssen et al., 2019). Through mapping how CF, shame, guilt, and mood may interact to influence eating-related behaviours, the review provides an integrated understanding of the cognitive and emotional mechanisms underpinning eating difficulties.

Limitations

The review is limited by several of the included studies adopting a cross-sectional design, which prevents the establishment of causal relationships. A lack of acknowledgement or control of confounding variables within included studies was another common limitation. For example, discrepancies among the findings of studies that included clinical samples identifying as ‘recovered’ and reporting less CF may be explained by engagement with psychological therapies that have targeted problematic CF (Woolley et al., 2024). Likewise, increased CF reported by those with severe ED psychopathology may be understood through the effects of malnutrition reducing capacities for insight to address CF experiences, based on the theory that calorific deprivation can significantly influence state and trait effects (Keys et al., 1950; Vitousek et al., 2004). Demographics pertaining to ethnicity, religious and cultural identities were also vastly underreported which means the

generalizability of findings may be limited by their ethnocentric focus on predominantly female-only western populations. A direction for future research is to review studies with more attention on culturally diverse samples. Another implication for future research is highlighted through the review's findings largely being derived from observational research. This reflects a gap in experimental research into experiences of CF in eating difficulties. Likewise, in consideration of the saturation of cross-sectional data pooled from this review, a need for longitudinal studies focussing on experiences of CF across key transitional milestones and ages has been identified.

Adopting broad and inclusive criteria on study design and definitions of the variables 'CF' and 'eating-related difficulties' widened the scope for potential findings. However, doing so brought notable methodological challenges to the interpretation of results. Grey literature searches were limited to thesis papers and most included studies were published journal articles, increasing the risk of publication bias (Kamei et al., 2021; Hopewell et al., 2009). Additionally, the exclusion of studies involving participants under 18 meant that some relevant mixed-age studies were excluded (Barney et al., 2022; Trindade & Ferreira, 2014; Masuda et al., 2010). However, this criterion was set in consideration of the evidence that suggests CF-related mechanisms may present differently in younger populations and reflect awareness of the ongoing neurodevelopmental, cognitive and emotional changes that are still taking place during adolescence (Blakemore & Mills, 2014; Steinberg, 2009). Furthermore, assessment tools measuring CF are primarily validated in adult samples (Masuda et al., 2010), and diagnostic criteria for EDs differ developmentally (APA, 2013). Excluding participants under 18 reduced heterogeneity and increased certainty that findings would pertain specifically to adult CF processes.

A significant limitation lay in the inconsistent measurement of CF and eating-related difficulties. Across the included studies, 13 different instruments of CF were used. These ranged from being highly specific tools, such as the FTS-I (Barnes, Fisak, & Tantleff-Dunn, 2010) to broader psychological flexibility measures like the AAQ-II (Bond et al., 2011) and AAQW (Lillis & Hayes, 2008). These instruments capture overlapping but notably, not identical constructs. For example, some concentrate on thought avoidance whilst others are more sensitive to experiential acceptance and or domain-specific CF. This heterogeneity raises concerns about construct validity and whether all studies should have been treated as measuring the same underlying phenomenon (Hayes et al., 2006; Levin et al., 2014). For instance, within the "weight-related variables" theme, the suppression of food-related thoughts (Barnes et al., 2013) and the acceptance of difficult weight-related experiences (Sairanen et al., 2015) reflect qualitatively different psychological processes, thus making it problematic to draw firm and generalisable conclusions from across the included studies (Hayes et al., 2006; Levin et al., 2014).

Nonetheless, the decision to include a diverse range of measures was deliberate. Restricting inclusion to one or two 'gold-standard' CF measures would have excluded much of the existing

literature, producing a fragmented and possibly biased synthesis (Moher et al., 2009). Moreover, CF research in the domain of eating-related difficulties is still conceptually evolving, with no single agreed operationalisation across clinical and non-clinical populations (Twohig & Levin, 2017). Therefore, a more comprehensive map of the field of current research in this area has been provided through including a range of measures that capture how researchers have interpreted and applied the CF construct in different contexts. This inclusivity not only broadens the empirical base but also attenuates the residual need for conceptual clarity and standardisation in measuring CF in relation to eating-related difficulties (Levin et al., 2014; Masuda et al., 2010).

Implications

Findings highlight several themes relevant to experiences of CF within eating-related difficulties. Applied in clinical practice, this may inform interventions for individuals reporting high CF in relation to eating habits or body image. Findings also prompt attention on the application of cognitive defusion techniques for addressing the over-identification with unpleasant body or food-related stimuli (Adams & Leary, 2007; Albers, 2011; Hussain et al., 2023). However, the efficacy of ACT-based interventions that target domain-specific facets of CF including TSF and body image-CF remains under investigated by the research base and indicates a residual gap for future research.

CF appeared in both clinical and non-clinical samples, suggesting that these cognitive-emotional components may contribute to the development as well as the maintenance of eating problems and highlight possible opportunities for early intervention. Nutrition and lifestyle-based content portrayed through social media can compound food-related anxiety and guilt when normal eating habits are disrupted by events such as holidays or celebrations (Dodds & Chamberlain, 2017; Fiuza & Rodgers, 2023). CF experiences may increase when having to navigate the demands of periods or holidays that are predominantly food-oriented; particularly within the context of a culture that places emphasis on physical appearance and 'health' as a reflection of one's worth (Abdulan et al., 2023). Adaptation and use of CF defusion tools may hence be expanded to any individuals who find disruptions to usual food-and-exercise routines stressful.

Conclusion

This review pinpoints CF as a transdiagnostic process that can contribute to the maintenance of eating-related difficulties through reinforcing problematic self-schema and the over-identification with negative body and diet-related thoughts. Evidence from 31 studies was synthesised and identified nine factors associating CF with eating-related difficulties, these were: emotional state, shame, demographic confounders, coping strategies, eating habits, personality traits, perceptions of symptoms, body image, and sociocultural context. There was consistent evidence of the role that body image-related CF can play in the relationships between shame, social comparison and eating-related difficulties. Mindfulness and self-compassion exercises were related to lower CF, whilst

emotional dysregulation, perfectionism and maladaptive coping styles were linked with higher CF. Future research should aim to clarify CF constructs, adopt longitudinal and experimental designs, and evaluate interventions that may strengthen the evidence for CF-informed intervention approaches for eating-related difficulties.

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Chapter 3

An Investigation into the Relationships between Cognitive Fusion and Eating Disorder

Psychopathology in Veiling and non-Veiling Muslim Women

The International Journal of Eating Disorders was selected to guide preparation of this paper. Journal guidelines (Appendix A) that manuscripts should not exceed 4,500 words excluding abstract, tables, figures, and references.

Word count (excluding abstract tables, figures, and references): 4683

Abstract

Objective: Muslim women are underrepresented in eating disorder research and their experiences not understood. This study aims to investigate the relationships between religious commitment, veiling, body checking, body image-related cognitive fusion and eating disorder psychopathology within a sample of Muslim women living in the UK.

Method: Self-report survey data measuring religious commitment, body checking, cognitive fusion, body image-related cognitive fusion and eating disorder psychopathology was collected from non-veiling ($n=59$) and veiling ($n=49$) Muslim women. Group differences were assessed using t-tests and relationships between variables were explored using Pearson's r correlational analysis. A multiple linear regression using blockwise selection explored the contribution of each variable to the model's explanatory power of eating disorder psychopathology.

Results: Religious commitment was associated with lower eating-disorder psychopathology. Veiling Muslim women reported higher religious commitment and lower cognitive fusion, body image-related cognitive fusion, body checking and eating disorder psychopathology than non-veilers. Together, veiling and religious commitment contributed significantly in the modelling of higher eating disorder psychopathology. However, when veiling and religious commitment were controlled for, 79% of the variation in eating disorder psychopathology was explained by religious commitment, veiling, cognitive fusion, body image-related cognitive fusion and body checking.

Discussion: Findings suggest that the practice of veiling, religious commitment, body image-related cognitive fusion and body checking are relevant to the holistic understanding of eating disorder psychopathology within Muslim women. This argues the need for the culturally sensitive enhancement of cognitive defusion techniques used to address eating disorder psychopathology. Possible roles for further experimental research are discussed.

Additional: For the International Journal of Eating Disorders

Public Significance Statement: This study suggests that veiling, religious commitment, cognitive fusion, body image-related cognitive fusion and body checking are related to disordered eating problems in Muslim Women. This is important for the culturally sensitive adaptation of therapeutic approaches used to address these problems.

KEY WORDS: Cognitive fusion, body image, body checking, eating disorders, Muslim women, veiling, hijab

Key Points:

- Findings suggest that the practice of veiling, religious commitment, body image-related cognitive fusion and body checking are relevant to a more holistic understanding of eating disorders within Muslim women.
- The need for the culturally sensitive refinement of cognitive defusion techniques used to address eating disorder psychopathology in Muslim women is discussed.
- The role for further empirical research using culturally sensitive research methods is discussed.

Introduction

Research on Eating Disorder (EDs) psychopathology exploring body checking and cognitive fusion (CF) is criticised for its focus on white, Western women (Cummins et al., 2005; Nikodijevic et al., 2018; Shafran et al., 2007); contributing to the impression that EDs are constrained to the colloquially labelled SWAG demographic of “skinny, white, affluent girls” (Sonneville & Lipson, 2018). ED experiences among diverse groups remain significantly overlooked, with little attention to the nuances of their manifestation within ethnic and religious minorities (Brown et al., 2009; Feinson & Meir, 2014; Tariq et al., 2021).

Over a quarter of the global population identifies as Muslim (Hackett et al., 2025) including approximately two million women in the UK (Office for National Statistics, 2021). Despite unique sociocultural challenges that may increase their risk of ED psychopathology, Muslim women remain an understudied group (Melisse et al., 2020; Mussap, 2009). Greater focus on their experiences may challenge culturally narrow models of EDs and promote more inclusive, sensitive research.

Cognitive Fusion

CF is defined in Acceptance and Commitment Therapy (ACT; Hayes, 2004) as the process of overidentifying with a thought to the extent that it is treated as complete truth rather than as a temporary mental event (Merwin & Wilson, 2009). Relational Frame Theory (RFT; Hayes et al., 2001) underpins ACT as a behavioural explanation of human language and cognition. From this perspective, CF occurs when thoughts become rigidly connected with one’s sense of self, through learnt associations between language and meaning. This can increase the power that thoughts have over behaviour.

CF is a significant treatment target of ACT, one of the third wave approaches of Cognitive Behavioural Therapy (CBT) recommended by the National Institute of Clinical Excellence [NICE] (2017). CBT views the relationship between thoughts and behaviours as core to ED psychopathology, with overidentification with negative body or food-related thoughts driving maladaptive behaviours such as body checking and restrictive eating (Fairburn et al., 2003). CF exacerbates this process as entanglement with negative thoughts reinforces distress and behaviours like restrictive eating, perpetuating a cycle of negative shape or weight-focussed self-evaluation that can lead to negative body image (Cash, 2012; Fairburn et al., 2003).

CF has been associated with inflexible and dichotomous thinking styles in EDs (Tchanturia et al., 2004; Miles et al., 2023). This has prompted interest in domain-specific constructs like body image-related CF (Trindade & Ferreira, 2014) and thought-shape fusion (TSF; Shafran et al., 1999). However, despite cultural and religious factors possibly shaping its expression and interpretation, CF in Muslim women remains underexplored. Veiling and fasting practices may influence relationships between cognition and ED psychopathology (Akrawi et al., 2015; Akgül et al., 2014; Lafmejani et al.,

2022) although mechanisms such as body image-related CF that may underpin these associations remain unclear.

Eating Disorder Psychopathology in Muslim Women

To fully understand ED psychopathology in Muslim women it is important to consider the wider sociocultural and religious factors often overlooked by standard psychological frameworks (Akrawi et al., 2015; Cummins et al., 2005; Murshed, 2025). The current evidence base is steered by Western, individualistic perspectives on 'SWAG' populations (Halbeisen et al., 2022). However, the application of a Western psychological lens to these difficulties in Muslim women risks over-pathologising culturally or religiously embedded practices. For example, Ramadan patterns of fasting followed by larger evening meals may be misinterpreted as binge-restrict behaviour. Similarly, normative Islamic practices and traditions such as breaking the fast with dates or eating salty foods may be mistaken for rigid ritualistic eating behaviour.

Generalising Western models to Muslim populations additionally risks oversight of aspects of Islam that may influence the coping and resilience of its worshippers (Lewis-Fernández & Kleinman, 1994). Values such as modesty, family honour, and spiritual coping that underpin Islamic practices may shape interpretations of food or body-related thought content (Chowbey et al., 2012; Hasan et al., 2021; Smolak & Chun-Kennedy, 2015). Similarly, through labelling intrusive or involuntary unwanted thoughts as 'waswasa' (Khan, 2025), Muslims are encouraged to recognise and respond to unpleasant mental content without overidentifying with it. This is akin to the cognitive defusion skills taught in ACT which encourage the labelling of recurrent problematic thoughts through approaches such as 'naming the story' (Hayes et al., 2012).

Veiling and Religious Commitment

The limited exploration of ED psychopathology among Muslim women may reflect perceptions of reduced vulnerability, supported by research suggesting that veiling practices may protect against body image concerns (Cummins et al., 2005; Huryk et al., 2021; Kertechian & Swami, 2016; Nasser, 2009; Rodgers et al., 2019; Wilhelm et al., 2018). The present study refers to veiling as the covering of the hair and often other parts of the body in accordance with Islamic principles of modesty (Begum, 2025; Dunkel et al., 2010). Veiling can represent faith, self-respect, or resistance to objectification (Sulaiman & Raifu, 2020). It has been associated with decreased body checking and lower internalisation of Western ideals, indicating potentially protective qualities (Kertechian & Swami, 2016; Wilhelm et al., 2018).

More broadly, modest dress and religious commitment may harness identity, belonging, and spiritual coping, protecting against sociocultural pressures towards thinness (Carvalho, 2013; Cheng & Youngju, 2018; Tolaymat & Moradi, 2011; Worthington et al., 2003). In this study, religious

commitment is defined using Worthington et al.'s (2003) Religious Commitment Inventory-10 (RCI-10) as the degree to which religious values, beliefs, and practices are internalised and integrated into daily life. Through a cognitive lens, Islamic guidance on 'waswasa', which emphasise that fleeting intrusive thoughts carry no moral substance, may reduce CF with body or food-related thoughts (Gunasinghe et al., 2019; Takhar, 2005).

Conversely, religious and cultural practices may heighten vulnerability. Fasting during Ramadan and Islamic family honour dynamics could add pressure, complicating relationships with food, shame and seeking help for psychological distress (Alghafli et al., 2019; Iles et al., 2017; Amlashi, 2018; Mahr & Nadeem, 2018; Mustafa, 2013; Sona, 2024). The impact of veiling and religious commitment therefore depends on the personal and cultural meanings of the individual. Acculturation adds to this picture, as navigating Western standards of beauty alongside Islamic commitments may increase CF with food or body-related thoughts, particularly during Ramadan, which by nature centres on food and self-discipline (Akgül et al., 2014; Chia et al., 2018; Thomas et al., 2018).

Aims and Rationale

Aims.

This study aims to investigate relationships between religious commitment, veiling, body checking, CF, body image-related CF, and ED psychopathology in UK Muslim women. By identifying factors associated with ED vulnerability, the research hopes to inform culturally sensitive interventions and enhance cultural competence among religious, research, and clinical psychology professionals.

Hypotheses.

1. Veiling participants will report higher levels of religious commitment and lower levels of body checking, CF, body image-related CF and ED psychopathology compared to non-veiling participants.
2. ED psychopathology will be positively associated with CF, body image-related CF, body checking and negatively associated with stronger religious commitment across the whole sample.
3. ED psychopathology will be positively associated with CF, body image-related CF and body checking when controlling for veiling and religious commitment.

Method

Participants

Eligible participants were Muslim women over the age of 18 living in the UK. An A-priori power analysis was conducted using G*Power version 3.1.9.4 (Faul et al., 2007) to establish the required minimum sample size of $n=92$. This was based on achieving 80% power for detecting a medium effect size ($d=0.15$) with five independent variables at a significance criterion of $\alpha = .05$, for linear multiple regression: fixed model, R^2 deviation from zero. In the absence of prior effect size estimates that could be based on studies of cognitive fusion in Muslim women, a medium effect size was selected as a conservative approach. This also ensured that recruitment of an achievable sample size was feasible given the study's time constraints.

A second, A-priori power analysis was conducted to determine the minimum sample size required to explore differences between veilers and non-veilers. To achieve 80% power for detecting a large effect size ($d=0.5$) between samples, at a significance criterion of $\alpha=.05$, $n=42$ participants were required for a two-tailed independent samples t-test. Previous research comparing veiling and non-veiling Muslim women on body image and religious commitment measures has demonstrated medium to large effect sizes (Swami et al., 2014; Wilhelm et al., 2018), supporting the use of a large effect size in the current power analysis.

Participants were 108 veiling ($n=49$) and non-veiling ($n=59$) Muslim women. See Table 6 for demographics. Participants ($N=108$) ages ranged from 18 to 53 years ($M=25.14$, $SD=8.52$). Veilers were asked to describe their method and frequency of veiling. The frequency of veiling was reported as: all the time ($n=9$), when outside of the home only ($n=38$) and only at special occasions or events ($n=2$). The methods of veiling that were reported were conventional Hijab ($n=36$) Niqab ($n=6$), Abaya and Hijab ($n=2$), Shayla ($n=2$), Chador ($n=2$) and Blusher Veil ($n=1$).

Table 6*Participant demographics*

Demographic		Veilers (<i>n</i> *=49)	Non-veilers (<i>n</i> =59)
Age (<i>M, SD</i>)		24.56 (7.12)	25.63 (9.56)
Ethnicity	White and Asian mixed	20.4%**	20.3%
	Arab	6.1%	3.4%
	White British	4.1%	16.9%
	Indian	16.3%	3.4%
	African	16.3%	1.7%
	Bangladeshi	16.3%	2.7%
	White and Black African mixed	2%	3.4%
	White and Black Caribbean mixed	2%	6.8%
	Pakistan	12.5%	25.4%
	Other	4%	16%
Relationship status	Single	63.2%	52.5%
	Married	18.4%	27.1%
	In a relationship	18.4%	20.4%

* Number of participants

**percentage of participants that identified

Procedure

Ethical approval for the study was granted at a local level (ERGO: 89852.A1; see Appendix I). A correlational design was used to investigate relationships between the following independent variables: veiling, religious commitment, CF, body image-related CF and body checking, and the outcome variable of ED psychopathology. There was no control for extraneous variables.

The study was advertised on social media platforms, a student participant pool recruitment system and in local Islamic worship centres. The recruitment poster (Appendix I) displayed a 'Quick Response' code that launched the participant information sheet when scanned (PIS; Appendix J). The researcher's contact details and information for supportive psychological resources were provided in the debriefing form (Appendix M). A brief mood repair task was included in the survey to minimise any changes in affect induced by participation (Appendix L).

Survey data was collected using Qualtrics. Consent was obtained via the participant information sheet. Once digitally received, consent launched the survey portal, and participants had up to 120 minutes to complete the survey (Appendix K) and optional mood repair task. Missing data was avoided through the 'forced response' setting of questions. Completion of the survey automated launch of the debrief page (Appendix M). This contained a link to a separate survey where participants were offered optional entry into a prize draw to win an online shopping voucher. Student participants were offered credits through the SONA system.

The anonymity of participants was declared in the PiS with the stipulation that participants opting to provide contact details for the optional prize draw would waive anonymity. These individuals were advised that their e-mail addresses could not be traced or matched to their data because this information was collected in a separate form. Participants were informed of their right to withdraw up until the point of data submission, after which the identification of individual responses would not be possible.

Measures

Participants submitted the following self-report data online through a Qualtrics survey (Appendix K).

Demographics

Demographics were captured through a form that asked participants for their age, ethnicity, relationship status and if applicable, method and frequency of veiling.

Body Checking

The Body Checking Questionnaire (BCQ; Reas et al., 2002) is a 23-item, 5-point Likert scale (5=very often; 1=never) measure of body checking behaviour frequency including measuring or pinching specific body parts (e.g., thighs and waist) and wearing special clothes or jewellery to gauge fit. Scores range from 23 to 115 with higher scores indicating a higher frequency of checking behaviours. It has good concurrent validity with similar measures of body image concerns and EDs (Reas et al., 2002).

Cognitive Fusion

The CF Questionnaire (CFQ; Gillanders et al., 2014) is a 7-item, 7-point Likert scale (7=always; 1=never true) measure of experiences of general CF. Scores range from 7 to 49. Higher scores indicate increased experiences of CF. It is unifactorial, reliable and has an excellent test-retest reliability of .80 for a non-clinical sample and high internal reliability in clinical ($\alpha = .88$) and non-clinical samples ($\alpha = .90$) (Gillanders et al., 2014). This was included as a baseline for comparison with scores on the Cognitive Fusion Questionnaire-Body Image (CFQ-BI; Ferreira et al., 2015).

Body image-related Cognitive Fusion

The CFQ-BI (Ferreira et al., 2015) is a 10-item, 7-point Likert scale (7=always; 1=never true) measure of body image-related CF. It adapts items from Gillanders et al.'s (2014) CFQ. Scores range from 7 to 70. Higher scores indicate higher incidence of negative body image-related CF. It has excellent internal consistency ($\alpha = .94$), good test-retest reliability ($r = .72$), convergent validity and divergent validity (Ferreira et al., 2015).

ED psychopathology

The ED Examination-Questionnaire-6.0 (EDE-Q; Fairburn & Beglin, 2008) is a 28-item, 7-point measure of ED psychopathology occurrence over the past 28 days (0 = no days, 1 = 1–5 days, 2 = 6–12 days, 3 = 13–15 days, 4 = 16–22 days, 5 = 23–27 days, 6 = every day, or “not at all” to “a lot”). It has four subscales: Restraint; Eating Concerns; Shape Concerns; and Weight Concerns. It includes measurement of self-reported frequency of ED behaviours (e.g. binge eating). Global EDE-Q is calculated by combining scores on each subscale. Mean global scores range between 0 and 6, with higher scores reflecting a greater frequency of ED psychopathology. Its Cronbach's alphas range from $\alpha = 0.85$ to $\alpha = 0.97$ (Hilbert et al., 2007) demonstrating good internal consistency.

Religious commitment

The religious commitment inventory (RCI; Worthington et al., 2012) is a 10-item, 5-point measure assessing ‘intrapersonal’ (internal, personal) and ‘interpersonal’ (external, relational) religious commitment. Scores range between 10 and 50. Higher scores indicate stronger commitment to religious beliefs and practices. Despite the relatively small sample ($n=12$) of Muslims in its validation (Worthington et al., 2012), several researchers have since applied the tool in their studies of Muslim participants and scores have demonstrated good evidence of reliability with coefficient alphas of at least .88 (Alaedein-Zawawi, 2015; Hart & Leach, 2017). Internal consistency of measures was calculated using Cronbach's coefficient alpha (α). Cronbach's alpha for each is reported in Table 7. These indicated strong internal consistencies across the measures used.

Table 7*Cronbach's alpha for measures used (N=108)*

Measure	α
Religious Commitment Inventory	.97
Cognitive Fusion Questionnaire	.95
Cognitive Fusion-Body Image Questionnaire	.95
Body Checking Questionnaire	.97
ED Examination	.95

Statistical Analyses

All analyses were run using SPSS version 29.0. Data distribution including normality, skewness and kurtosis was investigated using the Kolmogorov–Smirnov test and histograms (Fields, 2024, p.249). Homogeneity of variance was assessed with Levene's test. Bootstrapping using 95% bias-corrected confidence intervals based on 1000 bootstrap samples was used as a non-parametric alternative to provide adjusted confidence intervals for the means. The statistical significance level was set at $p \leq 0.05$, and all tests were two-tailed.

To address hypothesis 1, group comparisons were conducted via independent t-tests. These investigated differences in RCI, BCQ, CFQ, CFQ-BI and global EDE-Q scores between the veilers and non-veilers. Hypothesis 2 was investigated by running a correlational analysis that explored relationships between continuous variables across the whole sample.

Hypothesis 3 was examined by running a linear regression that set global EDE-Q score as the dependent variable and veiling, RCI, BCQ, CFQ and CFQ-BI scores as the independent variables. The regression was run using the enter method to allow for the ordering of independent variables into the model based on prior theoretical knowledge and empirical evidence about the likely significance of veiling and religious commitment within the final model (Field, 2024; Kertechian & Swami, 2016; Wilhelm et al., 2018). Veiling and religious commitment are also distinguishably demographic in nature when compared with CF and body checking; and informed their separation into block 1. CFQ, CFQ-BI and BCQ scores were entered into block 2.

Results

Descriptive statistics

Participants were not asked about current, historical or intervention experiences relating to an ED diagnosis. The mean global EDE-Q score for the whole sample was 2.34 which is near to the clinical cut-off of 2.48 used in similar studies (Machado et al., 2020). It is important to that that despite this sample being drawn from a non-clinical population, this figure exceeds the reported norms of 1.75 for UK women (Carey et al., 2019). It is however below the clinical cut-off of 2.8 reported by Mond et al. (2006), though this cut-off is not based on research representative of minority groups (Kalantzis et al., 2024; Meule, 2021). The means and standard deviations of the scores on each measure for veilers and non-veilers are presented in Table 8.

Assumptions of normality were not met as the data followed a bimodal distribution (Appendix N). Potential explanations for the bimodal distribution were explored by creating subsamples of veilers and non-veilers, and categorising participants into high EDE-Q for those who scored above the 2.8 clinical cut-off set by Mond et al. (2006) and low EDE-Q for those below. The bimodal distributions were also investigated by exploratorily splitting RCI scores at the median 30. Normal distributions for scores on CFQ, CFQ-BI and BCQ were found in sub-groups of participants scoring above the clinical cut-off for global EDE-Q and below the median on the RCI. Bimodal distributions may therefore have been partly explained by separate groups of those scoring within the clinical range on the EDE-Q and those scoring below 30 on the RCI. To address the issues of non-normality, results are based on statistical analysis performed using 1000 bootstrap resamples to estimate 95% confidence intervals.

Table 8

Mean (M) and standard deviation (SD) of scores for veilers (n=49) and non-veilers (n=59) on each measure

Variable	Veilers (n=49) M (SD)	Non-veilers (n=59) M (SD)
Religious Commitment Inventory	37.59 (9.01)	19.51 (9.80)
Cognitive Fusion-Questionnaire	17.65 (11.70)	27.63 (8.57)
Cognitive Fusion Questionnaire-Body Image	23.90 (15.43)	44.81 (9.73)
Body Checking Questionnaire	39.45 (16.63)	61.05 (22.98)
Eating Disorder Examination-Questionnaire	1.67 (1.17)	2.93 (1.30)

H1: Differences in RCI, CFQ, CFQ-BI, BCQ and EDE-Q scores between veiling and non-veiling Muslim women

A t-test was used to identify whether veilers ($n=49$) scored differently from non-veilers ($n=59$) on RCI, CFQ, CFQ-BI, BCQ and EDE-Q measures. Veilers reported higher religious commitment than non-veilers, $t(106)=9.90$, $p<.001$, mean difference = 18.08, (95% CI 14.3-21.5). Veilers also reported significantly lower levels of cognitive fusion, body image-related cognitive fusion, body checking and ED psychopathology (Table 9).

Table 9

Group differences in scores on RCI, CFQ, CFQ-BI, BCQ and EDE-Q between veilers ($n=49$) and non-veilers ($n=59$)

Variable	Group	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>t</i>	95% CI	
						Lower	Upper
Religious Commitment Inventory	Veilers	37.59	9.01	1.29	9.90	14.3	21.5
	Non-veilers	19.51	9.80	1.28			
Cognitive Fusion Questionnaire	Veilers	17.65	11.70	1.67	-5.11	-13.8	-6.7
	Non-veilers	27.63	8.57	1.12			
Cognitive Fusion Questionnaire-Body Image	Veilers	23.90	15.43	2.20	-8.57	-25.6	-16.2
	Non-veilers	44.81	9.73	1.27			
Body Checking Questionnaire	Veilers	39.45	16.63	2.38	-5.49	-29.0	-14.8
	Non-veilers	61.05	22.98	2.99			
Eating Disorder Examination-Questionnaire (Global)	Veilers	1.67	1.17	.17	5.25	-1.7	-0.8
	Non-veilers	2.93	1.30	.17			

Note. significance level $p<.001$. *M*=Mean. *SD*=Standard Deviation. [Bootstrapped] *SE*=Standard Error. *t*=*t* statistic. *CI*=Confidence Intervals

H2: Relationships between veiling, RCI, BCQ, CFQ, CFQ-BI and Global EDE-Q Scores

Correlation analyses (Table 10) were used to explore relationships between variables across the whole sample. Pearson's r analysis indicates there were strong positive correlations between

CFQ, CFQ-BI and BCQ scores. RCI scores were negatively correlated with global EDE-Q scores and strongly correlated with body image-related CF. This suggests that Muslim women who scored higher on religious commitment reported reduced ED psychopathology and less CF, body-image-related CF and body checking.

Table 10

Correlations between CFQ, CFQ-BI, RCI, BCQ and EDE-Q within the full sample (N=108)

Variable	ED Psychopathology	Cognitive Fusion	Cognitive Fusion- Body Image	Religious commitment
Cognitive Fusion	.79***			
Cognitive Fusion- Body Image	.73***	.68***		
Religious commitment	-.31**	-.30**	-.65***	
Body Checking	.83***	.79***	.61***	-.30**

Note. ** Correlation is significant at the $p=0.01$ level (2-tailed).

*** Correlation is significant at the $p<.001$ level (2-tailed)

H3: Association between ED psychopathology, body checking, cognitive fusion and body image-related cognitive fusion when controlling for veiling and religious commitment

Blockwise regression explored the relationship and incremental contribution of veiling and RCI, CFQ, CFQ-BI, and BCQ to EDE-Q in the whole sample (Tables 11 and 12). Veiling and RCI variables were entered into block 1 of the regression model. Veiling and RCI contributed significantly to the explanation of variance in ED psychopathology $F(2, 105)=13.63, p<.001$.

Results suggested that veiling and RCI score explained 21% of variance in ED psychopathology. However, only veiling was statistically significant in the model. The coefficient for veiling, represented by $\beta = -.458$ indicated the presence of a negative difference in the expected global EDE-Q score of veilers when compared to non-veilers. This means that veiling had a moderate negative relationship with global EDE-Q score and suggests that use of veiling was associated with reduced ED psychopathology. Religious commitment was not statistically significant when controlling for veiling. This suggests religious commitment alone, without consideration of veiling, doesn't significantly explain ED psychopathology.

Model 2 built on model 1 by adding BCQ, CFQ, CFQ-BI in block 2, whilst controlling for religious commitment and veiling in block 1. The R^2 change from Model 1 to Model 2 was .59 $F(5, 102) = 78.78, p < .001, R^2 = .79$ (Table 11). This indicates a significant improvement in the model's ability to explain the variability of global EDE-Q scores. The change in R^2 suggests that the model explains 59% more of the variation in comparison to Model 1. The overall model is significant and explains that 79% of the total variance in EDE-Q scores can be explained by veiling, RCI, CFQ, CFQ-BI and BCQ scores. Table 12 presents the statistics for each variable's contribution to the model. Muslim women that reported higher body checking also reported increased ED psychopathology $t(106)=6.38, p<.001, b=0.03$ [95% CI 0.02-0.04] as did those with higher CF and body-image related CF scores $t(106)=5.32, p<.001, b=0.04$ [95% CI 0.02-0.05].

When BCQ, CFQ and CFQ-BI scores were considered in Model 2, RCI scores and veiling explained less of the variance in ED psychopathology. This means that the variance explained by RCI and veiling was better explained when accounting for BCQ, CFQ and CFQ-BI scores. Table 11 summarises the changes in R^2 in Model 2 with the addition of body checking, CF and body image-related CF variables. This resulted in a significant increase in R^2 ($F(3,102) = 97.23, p<.001, R^2 = .79, R^2_{adjusted} = .78$). The increase in adjusted R^2 means that Model 2, which considers CFQ, CFQ-BI and BCQ scores offers a more reliable explanation of EDE-Q scores when controlling for veiling and RCI score.

Table 11

Summary of changes in regression models when BCQ, CFQ and CFQ-BI were added to model 1

Model	R	R^2	$R^2_{Adjusted}$	Change Statistics				
				R^2 Change	F Change	df	df	Sig. F Change
1	.454 ^a	.206	.191	.21	13.629	2	105	<.001
2	.891 ^b	.794	.784	.59	97.234	3	102	<.001

a. Variables: (Constant), Religious commitment, veiling

b. Variables: (Constant), Religious commitment, veiling, general cognitive fusion, cognitive fusion-body image, body checking

c. Outcome Variable: ED Psychopathology

Table 12*Contribution of each variable in each model Coefficients*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
	B	Std. Error*				Lower	Upper
1 (Constant)	2.91	.299		9.75	<.001	2.22	3.50
Veiling	-1.27	.335	-.458	-3.80	<.001	--2.15	-.45
Religious Commitment	.00	.013	.006	0.05	.958	-.03	.03
2 (Constant)	-1.39	.335		-4.16	<.001	-2.08	-.51
Veiling	.05	.190	.020	0.29	.776	-.37	.47
Religious Commitment	.02	.007	.151	2.15	.034	.00	.03.
Body Checking	.03	.005	.485	6.38	<.001	.02	.04
Cognitive Fusion	.02	.010	.173	2.11	.037	.00	.05
Body Image-related cognitive fusion	.04	.007	.427	5.32	<.001	.02	.05

*Bootstrap (1000) Estimate of Std. Error

Discussion

Main Findings

Muslim women are underrepresented in ED research. This study addresses current gaps in the understanding of ED psychopathology within this population. Consistent with hypotheses, significant differences were found between veiling and non-veiling Muslim women in relation to body checking, CF, body image-related CF, and ED psychopathology. Lower religious commitment scores were associated with higher body checking, CF and body image-related CF across the whole sample. Together, veiling and religious commitment scores contributed significantly in the modelling of ED psychopathology scores. However, when veiling and religious commitment were controlled, the total variance in ED psychopathology was better explained by the addition of CF, body image-related CF and body checking variables.

These findings support previous research that has identified higher religious commitment and spiritual activity among veilers compared to non-veilers (Utomo et al., 2018). The higher religious

commitment and lower body checking, CF and body image-related CF scores reported by veilers may reflect the veil as representing a stronger identification with Islam's teachings on beauty as a concept that is derived from within (Abuzar & Mansoor, 2024; Junaidin et al., 2022). This may lend support to the theorised 'protective' qualities of religious commitment and veiling against body dissatisfaction and ED psychopathology (Akrawi et al., 2015; Husain & Aziz, 2014; Rastmanesh et al., 2009).

An unexpected finding that raises consideration was the mean global EDE-Q score of 2.34, which is higher than reported norms for UK women and approaching clinical thresholds cited in previous research (2.48–2.8; Mond et al., 2006; Machado et al., 2020). This may reflect sample characteristics, as Muslim women face sociocultural pressures including navigating Western beauty ideals alongside religious and cultural expectations, compounded by factors such as acculturation stress, marriage and appearance pressures, and experiences of discrimination. ED psychopathology is especially prevalent among younger adults and university students (Eisenberg et al., 2011) and so it is important to note the relatively young mean age of the sample and the use of university participant pools for recruitment. Methodological factors such as self-selection into the study and the anonymity of online self-report may have also influenced elevated scores (Lavender & Anderson, 2009). These findings suggest that subclinical ED psychopathology may be more prevalent among Muslim women than previously assumed and emphasises the necessity for culturally sensitive screening and research.

The link between high religious commitment and lower body image-related CF may be explained by RCI-10 items 1 and 7. Frequent engagement with Islamic literature (item 1) may reinforce body-positive messages, while stronger identification with Islam's emphasis on inner beauty (item 7) reflects teachings such as: "Allah does not look at your outward appearance. He looks only at your hearts and your deeds." (Muslim, Birr, 33; Ibn Mājah, Zuhd, 9; Aḥmad ibn Ḥanbal, 2/285, 539). Such internalised values may buffer against negative body-related CF, aligning with findings that religiosity and exposure to affirming religious statements are associated with higher body esteem (Inman et al., 2014; Thompson & Stice, 2001). This highlights the need for further research on religious commitment, CF, and positive body image.

Strengths

This study offers a novel contribution to the literature on CF, body image-related CF, and ED psychopathology in Muslim women and extends the research base beyond the 'SWAG' populations predominantly represented (Pike et al., 2014). Despite previous evidence indicating that veiling is associated with reduced body checking and the internalisation of sociocultural beauty ideals (Dunkel et al., 2010; Swami et al., 2014) there had been no investigation of this alongside the core process of CF. Furthermore, the present study's focus on veiling and religious commitment highlighted a clinically important dimension of ED experience, acknowledging that cultural and religious factors may not only shape body image concerns, but also the cognitive processes that underlie their

psychopathology. Likewise, comparing veiling and non-veiling Muslim women provides valuable insight into differences within the Muslim community. This adds cultural relevance, strengthens the generalisability of the findings and emphasises the need for ED research and interventions to expand on current eurocentric perspectives (Murshed, 2025).

Limitations

Participants' motivations for veiling and differences in veil frequency and form, which may correspond or relate to body checking and interpretations of CF, was not explored. Despite their established links with ED psychopathology (Song et al., 2023; Le et al., 2022), other confounding factors such as BMI and acculturation, were also not assessed. Given participants' ethnic diversity, exploring acculturation and perceived shape or weight norms may have added valuable insight. This highlights a broader methodological concern regarding the limits of correlational and cross-sectional designs in establishing causality. Future research could manipulate body image-related CF, veiling and religious commitment variables and investigate them using a longitudinal design. Findings may also be expanded by investigating them within the context of other key practices such as fasting.

The most conservative methods of veiling including the niqab were underrepresented in the sample of veilers and highlights issues with the recruitment method. Likewise, recruitment via student and social media pools risked excluding eligible participants such as those without internet. Reliance on self-report for data collection risked introducing acquiescence bias, demand characteristics and social desirability bias. The sensitive nature of measures means responses may have been influenced by limited insight, perspectives or experiences at the time of survey completion (Vandereycken & Van Humbeeck, 2008). The use of forced answering to minimise missing data likewise may have influenced response bias and increased risk of type II error (Kreitchmann et al., 2019). Forced-response can increase dropout rates and reactive responses, especially in sensitive or demographic-related questions (Stieger et al., 2007). Questionnaires were completed in a fixed order which may have introduced order effects including priming, anchoring, primacy, and recency biases (Kite & Whitley, 2018; Taherdoost, 2024).

The cultural insensitivity of the measures used also represents significant weakness as cross-cultural differences impact the scoring of minority groups on instruments that have been standardized within a majority culture (Mushquash & Bova, 2007). For example, previous research has established that detection and recognition of ED psychopathology among Muslim populations differs from that of the non-Muslim populations upon which many measures were initially developed (Soh et al., 2006). The researcher did not adapt the EDE-Q to stipulate whether participants should account for religious motivations influencing intentional changes in eating behaviour. This is important considering some responses were submitted during Ramadan when deliberate fasting and consumption of larger quantities of food at suhoor or iftar are practiced.

Clinical Implications and Further Research

This study extends ED research beyond White, Western populations by investigating veiling, religious commitment, body checking, and CF processes in Muslim women. Findings indicate that veiling and higher religious commitment are associated with CF and ED psychopathology and possibly lend support to existing evidence that modesty and self-compassion can serve protective functions (Akrawi et al., 2017; Richards et al., 2018). These results highlight the importance of adapting interventions such as CBT-E and ACT to be culturally and religiously sensitive. For example, integrating religious values and motivations for veiling into cognitive defusion techniques may enhance engagement and outcomes for Muslim women. Future research should explore these relationships using longitudinal and experimental methods. It may also consider additional Islamic practices such as fasting and explore how acculturation, motivations and rationale for different forms of veiling may shape experiences and interpretations of ED psychopathology.

Conclusion

This study found that veiling and higher religious commitment may protect against body image-related CF, while CF and body checking remain key contributors to ED psychopathology in Muslim women. The findings highlight the need for culturally sensitive adaptations to ED interventions and further longitudinal research.

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Appendix A – International Journal of Eating Disorders Author Guidelines

Guidelines for Systematic Review

TITLE

Title: Identify the report as a systematic review. The Title includes one or two keywords to optimize search engine discoverability of the article.

ABSTRACT

See the PRISMA 2020 for Abstracts checklist. The Abstract is structured and is a recommended maximum of 250 words. Using the headers “Objective,” “Method,” “Results,” and “Discussion,” the Abstract concisely summarizes the article. The Abstract includes at least three of the manuscript’s identified keywords.

Keywords: Keywords are provided that capture relevant core concepts. Keywords may be single words (“health”) or short multi-word terms (“health services utilization”). The Editor recommends at least five keywords.

Public Significance: The Public Significance statement (< 70 words) explains why this research is important. It is written in plain English for a general, educated public.

INTRODUCTION

Rationale: Describe the rationale for the review in the context of existing knowledge.

Objectives: Provide an explicit statement of the objective(s) or question(s) the review addresses.

METHODS

Eligibility criteria:

Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.

Information sources: Please include a search of the unpublished (“grey”) literature (e.g., search Proquest, Google Scholar, Scopus, etc.). Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted. The search date must be within 6 months of the submission date.

- Search strategy:
Present the full search strategies for all databases, registers and websites, including any filters and limits used. Do not limit the initial search to the English-only literature. If you must ultimately exclude non-English language articles (e.g., due to inability to retrieve full texts, language barriers, etc.), create a reference list of all non-English language articles you excluded and upload the reference list in a supplemental file with your submission.
- Selection process: Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.
- Data collection process: Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.
- Data items: List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.

- List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.

Study risk of bias assessment:

Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.

Effect measures:

Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.

Synthesis methods:

- Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).
- Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.
- Describe any methods used to tabulate or visually display results of individual studies and syntheses
- Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.
- Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).
- Describe any sensitivity analyses conducted to assess robustness of the synthesized results.
- Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).
- Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.

RESULTS

Study selection

- Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.
- Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.
- Study characteristics: Cite each included study and present its characteristics.
- Risk of bias in studies: Present assessments of risk of bias for each included study.
- Results of individual studies: For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.
- Results of syntheses:
For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.

Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision

(e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.

Present results of all investigations of possible causes of heterogeneity among study results.

Present results of all sensitivity analyses conducted to assess the robustness of the synthesized result.

Reporting biases:

Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.

Certainty of evidence:

Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.

DISCUSSION

Discussion:

Provide a general interpretation of the results in the context of other evidence. Discuss any limitations of the evidence included in the review. Discuss any limitations of the review processes used. Discuss implications of the results for practice, policy, and future research.

OTHER INFORMATION

Registration and protocol:

Provide registration information for the review, including register name and registration number, or state that the review was not registered.

Indicate where the review protocol can be

accessed, or state that a protocol was not prepared. Describe and explain any amendments to information provided at registration or in the protocol.

Support: Describe sources of financial or non-

financial support for the review, and the role of the funders or sponsors in the review.

Competing interests: Declare any competing interests of review authors.

Availability of data, code and other materials: Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.

This checklist is

adapted for IJED from: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD et al.

The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n

71. doi: [10.1136/bmj.n71](https://doi.org/10.1136/bmj.n71)

Guidelines for research report/original article

1. Keywords are provided that capture relevant core concepts. Keywords may be single words (“health”) or short multi-word terms (“health services utilization”). The Editor recommends at least five keywords.
2. The Title is short and includes one or two keywords to optimize search engine discoverability of the article. **Writing Articles for SEO**
3. The Abstract is structured and is a recommended maximum of 250 Using the headers “Objective,” “Method,” “Results,” and “Discussion,” the Abstract concisely summarizes the article. The Abstract includes at least three of the manuscript’s identified keywords.
4. The Public Significance statement (< 70 words) explains how the proposed novel approach(es) or (solutions) will advance the field. It is written in plain English for a general, educated public.
5. The Introduction describes how the study builds upon prior research, addresses specific knowledge gaps, and promises to advance the field. The introduction specifies whether the study is hypothesis-generating or hypothesis-testing (if the latter, testable hypotheses are stated).
6. If applicable, the Method section states where the study was preregistered.
7. The Method section describes how participants were recruited, over what time; and what inclusion/exclusion criteria were applied.
8. The Method section supports the choice of study measures with relevant reliability and validity information.
9. The Method and Results sections conform to the **IJED Statistical Reporting Guidelines** and the **Statistical Reporting Checklist**.
10. The Method section attests that ethical approval was obtained and names the entity providing the approval; else, if applicable, it explains why the research was exempt from ethical review and approval.
11. The sample description conforms to the **IJED Demographic Variables Reporting Guidelines** and includes age (required) and sex or gender (required), and where possible, socioeconomic status and race and (Depending on the study design, the sample should be described in Method or Results.)
12. The Discussion offers a balanced interpretation of study findings; includes a section on strengths and limitations; recommends future studies; and describes clinical or policy implications (if applicable).

Appendix B - PRSIMA Checklist

Section and Topic	Item	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	

Section and Topic	Item	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	
Study characteristics	17	Cite each included study and present its characteristics.	
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence credible interval), ideally using structured tables or plots.	
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	
	23b	Discuss any limitations of the evidence included in the review.	
	23c	Discuss any limitations of the review processes used.	
	23d	Discuss implications of the results for practice, policy, and future research.	
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

Appendix C - Systematic Review: Inter-rater Disagreements and Indecisions Matrix

NOTE.

Highlight yellow = papers flagged for indecision (column iv) by BOTH reviewers. These were discussed in supervision and a final decision made about the study's categorisation as A or B (column vii)

Highlight grey = papers flagged for disagreement (column v) between reviewers were discussed in supervision and a final decision made about the study's categorisation as A or B (column vii)

A=Study included

B=Study not included

C=Indecision

i	ii	iii	iv	v	vi	vii
Study #	Reviewer 1 (S.J) Decision	Reviewer 2 (A.C) Decision	Flagged for Indecision or disagreement? (Y/N)	Agreement reached between A.C and S.J (1=Yes, 0=No)	Discussed and resolved in supervision? (Y/N)	Outcome of supervision (A/B)
1.	B	B	N	1	Y	
2.	B	B	N	1	Y	
3.	C	C	Y	1	Y	B
4.	B	B	N	1	Y	
5.	B	B	N	1	Y	
6.	B	B	N	1	Y	
7.	B	B	N	1	Y	
8.	B	B	N	1	Y	
9.	B	B	N	1	Y	
10.	A	A	N	1	Y	
11.	B	B	N	1	Y	
12.	B	B	N	1	Y	
13.	B	B	N	1	Y	
14.	B	B	N	1	Y	
15.	B	C	Y	0	Y	B
16.	C	B	Y	0	Y	B
17.	C	B	Y	0	Y	B
18.	B	B	N	1	Y	
19.	B	B	N	1	Y	
20.	B	B	N	1	Y	
21.	B	B	N	1	Y	
22.	B	B	N	1	Y	

i	ii	iii	iv	v	vi	vii
Study #	Reviewer 1 (S.J) Decision	Reviewer 2 (A.C) Decision	Flagged for Indecision or disagreement? (Y/N)	Agreement reached between A.C and S.J (1=Yes, 0=No)	Discussed and resolved in supervision? (Y/N)	Outcome of supervision (A/B)
23.	A	A	N	1	Y	
24.	B	B	N	1	Y	
25.	B	B	N	1	Y	
26.	B	B	N	1	Y	
27.	B	C	Y	0	Y	B
28.	B	B	N	1	Y	
29.	B	B	N	1	Y	
30.	B	B	N	1	Y	
31.	B	B	N	1	Y	
32.	B	B	N	1	Y	
33.	B	B	N	1	Y	
34.	B	B	N	1	Y	
35.	B	B	N	1	Y	
36.	B	B	N	1	Y	
37.	C	C	Y	1	Y	B
38.	B	B	N	1	Y	
39.	A	A	N	1	Y	
40.	B	B	N	1	Y	
41.	B	B	N	1	Y	
42.	B	B	N	1	Y	
43.	B	B	N	1	Y	
44.	B	B	N	1	Y	
45.	B	B	N	1	Y	
46.	B	B	N	1	Y	
47.	B	B	N	1	Y	
48.	B	B	N	1	Y	
49.	B	B	N	1	Y	
50.	B	B	N	1	Y	

i	ii	iii	iv	v	vi	vii
Study #	Reviewer 1 (S.J) Decision	Reviewer 2 (A.C) Decision	Flagged for Indecision or disagreement? (Y/N)	Agreement reached between A.C and S.J (1=Yes, 0=No)	Discussed and resolved in supervision? (Y/N)	Outcome of supervision (A/B)
51.	A	C	Y	0	Y	A
52.	B	B	N	1	Y	
53.	B	B	N	1	Y	
54.	B	B	N	1	Y	
55.	B	B	N	1	Y	
56.	B	B	N	1	Y	
57.	B	B	N	1	Y	
58.	B	B	N	1	Y	
59.	B	B	N	1	Y	
60.	B	B	N	1	Y	
61.	B	B	N	1	Y	
62.	B	B	N	1	Y	
63.	B	B	N	1	Y	
64.	B	B	N	1	Y	
65.	B	B	N	1	Y	
66.	B	B	N	1	Y	
67.	C	C	Y	1	Y	B
68.	B	B	N	1	Y	
69.	B	B	N	1	Y	
70.	B	B	N	1	Y	
71.	B	B	N	1	Y	
72.	B	B	N	1	Y	
73.	B	B	N	1	Y	
74.	B	B	N	1	Y	
75.	B	B	N	1	Y	
76.	B	B	N	1	Y	
77.	B	B	N	1	Y	
78.	B	B	N	1	Y	

i	ii	iii	iv	v	vi	vii
Study #	Reviewer 1 (S.J) Decision	Reviewer 2 (A.C) Decision	Flagged for Indecision or disagreement? (Y/N)	Agreement reached between A.C and S.J (1=Yes, 0=No)	Discussed and resolved in supervision? (Y/N)	Outcome of supervision (A/B)
79.	A	A	N	1	Y	
80.	B	B	N	1	Y	
81.	B	B	N	1	Y	
82.	B	B	N	1	Y	
83.	B	B	N	1	Y	
84.	B	B	N	1	Y	
85.	B	B	N	1	Y	
86.	B	B	N	1	Y	
87.	B	B	N	1	Y	
88.	B	B	N	1	Y	
89.	B	B	N	1	Y	
90.	B	B	N	1	Y	
91.	B	B	N	1	Y	
92.	B	B	N	1	Y	
93.	B	B	N	1	Y	
94.	B	B	N	1	Y	
95.	B	B	N	1	Y	
96.	B	B	N	1	Y	
97.	B	B	N	1	Y	
98.	B	B	N	1	Y	
99.	B	B	N	1	Y	
100.	B	B	N	1	Y	
101.	B	B	N	1	Y	
102.	B	B	N	1	Y	
103.	B	B	N	1	Y	
104.	B	B	N	1	Y	
105.	B	B	N	1	Y	
106.	A	A	N	1	Y	

i	ii	iii	iv	v	vi	vii
Study #	Reviewer 1 (S.J) Decision	Reviewer 2 (A.C) Decision	Flagged for Indecision or disagreement? (Y/N)	Agreement reached between A.C and S.J (1=Yes, 0=No)	Discussed and resolved in supervision? (Y/N)	Outcome of supervision (A/B)
107.	B	B	N	1	Y	
108.	B	B	N	1	Y	
109.	B	B	N	1	Y	
110.	B	B	N	1	Y	
111.	B	B	N	1	Y	
112.	B	B	N	1	Y	
113.	B	B	N	1	Y	
114.	B	B	N	1	Y	
115.	B	B	N	1	Y	
116.	B	B	N	1	Y	
117.	B	B	N	1	Y	
118.	C	C	Y	1	Y	B
119.	B	B	N	1	Y	
120.	B	B	N	1	Y	
121.	B	B	N	1	Y	
122.	B	B	N	1	Y	
123.	B	B	N	1	Y	
124.	B	B	N	1	Y	
125.	B	B	N	1	Y	
126.	B	B	N	1	Y	
127.	B	B	N	1	Y	
128.	B	B	N	1	Y	
129.	B	B	N	1	Y	
130.	B	B	N	1	Y	
131.	B	B	N	1	Y	
132.	B	B	N	1	Y	
133.	B	B	N	1	Y	
134.	B	B	N	1	N	

i	ii	iii	iv	v	vi	vii
Study #	Reviewer 1 (S.J) Decision	Reviewer 2 (A.C) Decision	Flagged for Indecision or disagreement? (Y/N)	Agreement reached between A.C and S.J (1=Yes, 0=No)	Discussed and resolved in supervision? (Y/N)	Outcome of supervision (A/B)
135.	B	B	N	1	Y	
136.	B	B	N	1	Y	
137.	B	B	N	1	Y	
138.	B	B	N	1	Y	
139.	B	B	N	1	Y	
140.	B	B	N	1	Y	
141.	B	B	N	1	Y	
142.	B	B	N	1	Y	
143.	B	B	N	1	Y	
144.	B	B	N	1	Y	
145.	B	B	N	1	Y	
146.	B	B	N	1	Y	
147.	B	B	N	1	Y	
148.	B	B	N	1	Y	
149.	B	B	N	1	Y	
150.	B	B	N	1	Y	
151.	B	B	N	1	Y	
152.	B	B	N	1	Y	
153.	B	B	N	1	Y	
154.	B	B	N	1	Y	
155.	B	B	N	1	Y	
156.	B	B	N	1	Y	
157.	B	B	N	1	Y	
158.	B	B	N	1	Y	
159.	B	B	N	1	Y	
160.	B	B	N	1	Y	
161.	B	B	N	1	Y	
162.	C	C	Y	1	Y	B

i	ii	iii	iv	v	vi	vii
Study #	Reviewer 1 (S.J) Decision	Reviewer 2 (A.C) Decision	Flagged for Indecision or disagreement? (Y/N)	Agreement reached between A.C and S.J (1=Yes, 0=No)	Discussed and resolved in supervision? (Y/N)	Outcome of supervision (A/B)
163.	B	B	N	1	Y	
164.	B	B	N	1	Y	
165.	B	B	N	1	Y	
166.	B	B	N	1	Y	
167.	B	B	N	1	Y	
168.	B	B	N	1	Y	
169.	B	B	N	1	Y	
170.	B	B	N	1	Y	
171.	B	B	N	1	Y	
172.	B	B	N	1	Y	
173.	B	B	N	1	Y	
174.	B	B	N	1	Y	
175.	B	B	N	1	Y	
176.	B	B	N	1	Y	
177.	B	B	N	1	Y	
178.	B	B	N	1	Y	
179.	B	B	N	1	Y	
180.	B	B	N	1	Y	
181.	B	B	N	1	Y	
182.	B	B	N	1	Y	
183.	B	B	N	1	Y	
184.	B	B	N	1	Y	
185.	B	B	N	1	Y	
186.	C	C	Y	1	Y	B
187.	B	B	N	1	Y	
188.	B	B	N	1	Y	
189.	B	B	N	1	Y	
190.	B	B	N	1	Y	

i	ii	iii	iv	v	vi	vii
Study #	Reviewer 1 (S.J) Decision	Reviewer 2 (A.C) Decision	Flagged for Indecision or disagreement? (Y/N)	Agreement reached between A.C and S.J (1=Yes, 0=No)	Discussed and resolved in supervision? (Y/N)	Outcome of supervision (A/B)
191.	B	B	N	1	Y	
192.	B	B	N	1	Y	
193.	B	B	N	1	Y	

Appendix D - QualSyst Quality Assessment Tool for Quantitative Studies (Kmet, 2004)

1. Was the study question/objective clearly stated?
2. Was the study design appropriate for the research question?
3. Was the method of subject/comparison group selection or source of information/input variables described and appropriate?
4. Were the subject characteristics sufficiently described?
5. Was the intervention/exposure clearly described?
6. Were outcome measures well defined and robust to measurement bias?
7. Were sample size and power calculations described and adequate?
8. Was the analytic method described and appropriate?
9. Was the variability of the sample or outcome measures estimated?
10. Were the results reported in sufficient detail?
11. Were conclusions supported by the results?
12. Were the confounding variables accounted for in the design and/or analysis?
13. Were the findings generalizable to the population of interest?
14. Was the funding source or conflict of interest stated?

Appendix E - Synthesis Without Meta-analysis (SWiM) reporting items

Synthesis Without Meta-analysis (SWiM) reporting items

The citation for the Synthesis Without Meta-analysis explanation and elaboration article is: Campbell M, McKenzie JE, Sowden A, Katikireddi SV, Brennan SE, Ellis S, Hartmann-Boyce J, Ryan R, Shepperd S, Thomas J, Welch V, Thomson H. Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline BMJ 2020;368:l6890 <http://dx.doi.org/10.1136/bmj.l6890>

SWiM is intended to complement and be used as an extension to PRISMA			
SWiM reporting item	Item description	Page in manuscript where item is reported	Other*
<i>Methods</i>			
1 Grouping studies for synthesis	1a) Provide a description of, and rationale for, the groups used in the synthesis (e.g., groupings of populations, interventions, outcomes, study design)		
	1b) Detail and provide rationale for any changes made subsequent to the protocol in the groups used in the synthesis		
2 Describe the standardised metric and transformation methods used	Describe the standardised metric for each outcome. Explain why the metric(s) was chosen, and describe any methods used to transform the intervention effects, as reported in the study, to the standardised metric, citing any methodological guidance consulted		
3 Describe the synthesis methods	Describe and justify the methods used to synthesise the effects for each outcome when it was not possible to undertake a meta-analysis of effect estimates		
4 Criteria used to prioritise results for summary and synthesis	Where applicable, provide the criteria used, with supporting justification, to select the particular studies, or a particular study, for the main synthesis or to draw conclusions from the synthesis (e.g., based on study design, risk of bias assessments, directness in relation to the review question)		

SWiM reporting item	Item description	Page in manuscript where item is reported	Other*
5 Investigation of heterogeneity in reported effects	State the method(s) used to examine heterogeneity in reported effects when it was not possible to undertake a meta-analysis of effect estimates and its extensions to investigate heterogeneity		
6 Certainty of evidence	Describe the methods used to assess certainty of the synthesis findings		
7 Data presentation methods	Describe the graphical and tabular methods used to present the effects (e.g., tables, forest plots, harvest plots). Specify key study characteristics (e.g., study design, risk of bias) used to order the studies, in the text and any tables or graphs, clearly referencing the studies included		
<i>Results</i>			
8 Reporting results	For each comparison and outcome, provide a description of the synthesised findings, and the certainty of the findings. Describe the result in language that is consistent with the question the synthesis addresses, and indicate which studies contribute to the synthesis		
<i>Discussion</i>			
9 Limitations of the synthesis	Report the limitations of the synthesis methods used and/or the groupings used in the synthesis, and how these affect the conclusions that can be drawn in relation to the original review question		

PRISMA=Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

*If the information is not provided in the systematic review, give details of where this information is available (e.g., protocol, other published papers (provide citation details), or website (provide the URL)).

Appendix F - Measures of CF and eating difficulties used in each of the included studies

Paper	Measure of CF
Coelho et al. (2010) Jauregui- Lobera (2012) Ouellet- Courtois et al. (2015) Radomsky et al. (2002) Shafran et al. (1999) Shafran & Robinson (2004) Wyssen et al. (2016) Wyssen et al. (2019)	Thought– Shape Fusion Scale (TSF scale; Shafran et al., 1999) or, Trait only subset of the TSF scale (Trait TSF; Shafran et al., 1999)
Mendes et al. (2022) Sairanen et al. (2020) Shafran & Robinson (2004) Stefani (2008) Wendell et al. (2012) White (2018)	Body image-acceptance and action questionnaire (BI-AAQ; Ferreira et al., 2011)
Bento et al. (2017) Melo et al. (2020) Scardera et al. (2020) Trindade & Ferreira (2015)	CF Questionnaire: Body Image (CFQ-BI; Ferreira, Trindade, Duarte, & Pinto-Gouveia, 2014)
Coelho et al. (2010) Jauregui- Lobera et al. (2012) Ouellet- Courtois et al. (2015)	State thought-shape fusion scale (state TSF; adapted from Radomsky et al., 2002)
Miles et al. (2022) Miles et al. (2023) Thompson (2024)	Cognitive Flexibility Inventory (CFI; Dennis & Vander Wal, 2010)
Miles et al. (2023) Rudiger & Winstead (2013)	Ruminative Response Scale for EDs (RRS-ED; Cowdrey & Park, 2011)
Miles et al. (2022) Mora- Maltas et al. (2023)	Computerized Wisconsin Card Sorting Test (WCST) (Feldstein et al., 1999)
Duarte & Pinto-Gouveia (2017)	The Co-Rumination Questionnaire (CRQ; Rose, 2002)
Rudiger & Winstead (2013)	The Assessment of Body Image Cognitive Distortions (ABCD; Jakatadar et al., 2006)
Rudiger & Winstead (2013)	Appearance Schemas Inventory Revised (ASI-R; Cash et al., 2004)
Tchanturia et al. (2011)	The Brixton Spatial Anticipation Test (Burgess, 1997)
Upton (2020)	Multidimensional Psychological Flexibility Inventory (MPFI; Rogge & Lin, 2024)
Wetzel & Himmelstein (2023)	Modified Weight Bias Internalisation Scale (WBIS-M; Pearl & Puhl, 2014)

Appendix G – Systematic Review studies organised according to consistent use of eating-related difficulties measure

Author(s) and Publication Year	Measure of eating difficulties
Barnes et al. (2013) Bento et al. (2017) Dann et al. (2013) Dubois et al. (2016) Mendes et al. (2022) Miles et al. (2023) Ouellet- Courtois et al. (2015) Shafran et al., (1999) Shafran & Robinson (2004) Sternheim (2022) Wendell (2012) White (2018) Wyssen et al. (2016) Wyssen et al. (2019)	ED Examination-Questionnaire (EQE-Q; Fairburn, Wilson & Schleimer, 1993)
Duarte & Pinto-Gouveia (2017)	ED Examination 16.0D (EDE 16.0D; Fairburn, Cooper & O'Connor, 2008)
Duarte & Pinto-Gouveia (2017)	Binge Eating Scale (BES; Gormally et al., 1982)
Jauregui- Lobera (2012); Mora-Maltas et al. (2023)	ED Inventory-2 (EDI-2; Garner, 1991)
Klein et al., 2022	ED Diagnostic Scale (EDDS; Stice et al., 2000)
Rudiger & Winstead, 2013; Stefani, 2008	Eating Attitudes Test 26 (EAT-26; Garner et al., 1982)
Scardera et al., 2020	The Disordered Eating Questionnaire (DEQ; Lombardo et al., 2011)

Appendix H - ERGO Ethical Approval

Approved by Faculty Ethics Committee - ERGO II 89852.A1



ergo2@soton.ac.uk

To Sarah Johnson

Approved by Faculty Ethics Committee - ERGO II 89852.A1



ERGO II – Ethics and Research Governance Online <https://www.ergo2.soton.ac.uk>

Submission ID: 89852.A1

Submission Title: DClinPsy Thesis - Exploring the relationship between body checking, body image-related cognitive fusion and eating disorder psychopathology in Muslim women (Amendment 1)

Submitter Name: Sarah Johnson

Your submission has now been approved by the Faculty Ethics Committee. You can begin your research unless you are still awaiting any other reviews or conditions of your approval.

Comments:

- Please indicate which parts have been changed by highlighting the revised sections in future amendments.
- Next time, please make it clearer what amendments you are making and highlight these changes in the relevant documents. Thank you.

Appendix I - Study Advert

Are you a Muslim Woman?



COULD YOU HELP US TO UNDERSTAND MORE ABOUT BODY IMAGE?

We are looking for **Muslim Women aged 18+** to help explore thoughts and feelings relating to body image.

WHAT WILL BE INVOLVED?

Scan the QR code at the bottom of this poster to take part today. You will complete a series of five short questionnaires relating to body-image, faith and eating habits.

HOW MIGHT YOU AND OTHERS BENEFIT?

As well as contributing to current gaps in what we know about Muslim women and how they relate to their bodies, you may also:

- Enter a prize draw to win 1 of 5 x £20 Amazon vouchers (by providing your e-mail address)
- Gain SONA credits (UoS Psychology students only)

**TAKE PART NOW BY SCANNING THE
QR OR BY CLICKING THE LINK BELOW**
https://southampton.qualtrics.com/jfe/form/SV_0wg8S0JLwdw0AVE



Appendix J - Participant Information Sheet

Study Title: Exploring the relationship between body checking, body image-related cognitive fusion and eating disorder psychopathology in Muslim Women

Researcher(s): Sarah Johnson, Katy Sivyver, Kate Willoughby

University email: sj10n22@soton.ac.uk

Ethics/ERGO no: 89852

Version and date: Version 1: 05.04.24

What is the research about?

My name is Sarah Johnson and I am a Doctorate in Clinical Psychology student at the University of Southampton in the United Kingdom. I am inviting you to participate in a study that will explore body checking, body image-related thought fusion and eating disorder psychopathology in Muslim women. The study aims to investigate relationships between body checking, body-image related thought fusion and eating disorder psychopathology in Muslim women. I am also interested in exploring whether religiosity and the practice of veiling is associated with body checking, body image-related thought fusion and eating disorder psychopathology. This study was approved by the Faculty Research Ethics Committee (FREC) at the University of Southampton (Ethics/ERGO Number: 89852)

What will happen to me if I take part?

This study involves completing a series of anonymous questionnaire which should take approximately 20 minutes of your time. After 120 minutes, the survey will time-out and your responses will not be saved.

If you are happy to complete this survey, you will need to tick (check) the box below to show your consent.

This survey is anonymous, which means the researcher will not be able to know which answers that you have provided. In recognition of your participation, you will have the opportunity to enter into a prize draw to win 1 of 5 x £20 Amazon shopping vouchers. If you wish to enter the draw, please follow the link at the end of the questionnaires which will open a separate survey. This survey will ask you to provide an e-mail address so that you can be contacted if you win. To deter duplicate entries from being made, Qualtrics will detect the IP address of anyone that submits their e-mail address to the prize draw. However, It will not be possible for the researcher to match e-mail addresses to responses submitted to the main survey of questionnaires.

Why have I been asked to participate?

You have been asked to take part because you identify yourself as: Muslim, female and over the age

of 18

Please note that the demographic questionnaire will ask you whether you practice veiling as part of your faith, however the practice of veiling is not a requirement to take part. If you do not wear a religious veil and meet criteria 1-3 then you are still eligible to take part.

What information will be collected?

The questions in this survey ask for information in relation to your ethnicity, marital status and whether you practice veiling as part of your faith. Once you have answered these questions, you will then be presented with 5 questionnaires, followed by a brief, optional mood-repair task. The questions within the questionnaires will ask you for information surrounding religiosity, body checking behaviours, cognitive fusion (the extent to which your thoughts influence your behaviour), body image related cognitive fusion and eating disorder symptomology. Some of these questionnaires may be considered as sensitive, particularly if you or someone you are close to has a history of eating or body image difficulties.

The survey will end with an optional mood-repair task which contains textboxes where you will be asked to type in your own answers. Please note that for this survey to be anonymous, you should not include in your text box answers any information from which you, or other people, could be identified.

What are the possible benefits of taking part?

If you are a student of the University of Southampton, then direct benefit of participation in this study will be awarded via eFolio study credits. If you are not a University of Southampton student, then in recognition of your participation you can instead enter into a prize draw to win a £100 Amazon shopping voucher. You can do this through following the second link at the end of the questionnaires. Please note, any benefit of participation will only be awarded upon completion of all questionnaires.

Are there any risks involved?

There is a possibility that taking part in this study could cause you some psychological discomfort and/or distress. If this happens, you can contact the following resources for support:

BEAT Eating Disorders Helpline: 0808 801 0677

Samaritans Helpline: 116 123

Mind info line: 0300 123 3393

Please also be encouraged to contact your GP for support if you have any concerns relating to the

topics explored in this research.

What will happen to the information collected?

All information collected for this study will be stored securely on a password protected computer and backed up on a secure server. In addition, all data will be pooled and only compiled into data summaries or summary reports. Only the researcher and their supervisor will have access to this information. The information collected will be analysed and written up as part of the researcher's published Doctoral thesis, which will be published in a journal and presented at conferences.

The University of Southampton conducts research to the highest standards of ethics and research integrity. In accordance with our Research Data Management Policy, data will be held for 10 years after the study has finished when it will be securely destroyed. What happens if there is a problem? If you are unhappy about any aspect of this study and would like to make a formal complaint, you can contact the Head of Research Integrity and Governance, University of Southampton, on the following contact details: Email: rgoinfo@soton.ac.uk, phone: + 44 2380 595058. Please quote the Ethics/ERGO number above. Please note that by making a complaint you might be no longer anonymous. More information on your rights as a study participant is available via this link: <https://www.southampton.ac.uk/about/governance/participant-information.page>

Thank you for reading this information sheet and considering taking part in this research.

Appendix K – Participant survey

ERGO: 89852 | Version 2: 05.07.24

Questionnaire Pack**Pre-survey screening**

- | | |
|--|--|
| 1. Are you age 18 or over?
Yes/
No | 2. Do you identify as a woman?
Yes/
No |
| | 3. Do you identify as Muslim?
Yes/
No |

Demographic questions**1. Please enter your age into the box below:****2. Please select how you would describe your ethnicity.****White**

- i. English / Welsh / Scottish / Northern Irish / British
- ii. Irish
- iii. Gypsy or Irish Traveller
- iv. Any other White background (please specify): _____

- I. Indian
- II. Pakistani
- III. Bangladeshi
- IV. Chinese
- V. Any other Asian background, please describe

Black / African / Caribbean / Black British**Mixed / Multiple ethnic groups**

- I. White and Black Caribbean
- II. White and Black African
- III. White and Asian
- IV. Any other Mixed / Multiple ethnic background, please describe

- I. African
- II. Caribbean
- III. Any other Black / African / Caribbean background, please describe

Other ethnic group

- I. Arab
- II. Any other ethnic group, please describe

Asian / Asian British

3. Please select how you would describe your current relationship status.

- I. Single
- II. In a relationship
- III. In a long-term relationship (5+ years)
- IV. Married
- V. Divorced/Separated
- VI. Widowed

4a) Do you practice veiling as part of your faith?

- I. Yes
- II. No

If you answered yes, please continue to 4b and 4c.

4b) If you answered YES to 4A, please name the type of veil you would most frequently wear

4c) if you answered YES to 4A, please tell us how often you wear your veil

- I. All of the time, including when at home and work/school
- II. Only when outside of my home
- III. Only on special occasions such as at weddings, funerals
- IV. I rarely wear my veil
- V. Other, please tell us more: _____

Body Checking Questionnaire (Reas et al., 2002)

	1	2	3	4	5
	Never	Rarely	Sometimes	Often	Very often
1. I check to see if my thighs spread when I sit down	1	2	3	4	5
2. I pinch my stomach to measure fatness	1	2	3	4	5
3. I have special clothes which I try on to make sure they still fit	1	2	3	4	5
4. I check the diameter of my wrist to make sure it's the same size as before.	1	2	3	4	5
5. I check my reflection in glass doors or car windows to see how I look	1	2	3	4	5
6. I pinch my upper arms to measure fatness	1	2	3	4	5
7. I touch underneath my chin to make sure I don't have a "double chin"	1	2	3	4	5
8. I look at others to see how my body size compares to their body size.	1	2	3	4	5
9. I rub (or touch) my thighs while sitting to check for fatness	1	2	3	4	5
10. I check the diameter of my legs to make sure they're the same size as before	1	2	3	4	5
11. I ask others about their weight or clothing size so I can compare my own weight/size	1	2	3	4	5
12. I check to see how my bottom looks in the mirror	1	2	3	4	5

13. I practice sitting and standing in various positions to see how I would look in each position	1	2	3	4	5
14. I check to see if my thighs rub together	1	2	3	4	5
15. I try to elicit comments from others about how fat I am	1	2	3	4	5
16. I check to see if my fat jiggles	1	2	3	4	5
17. I suck in my gut to see what it is like when my stomach is completely flat	1	2	3	4	5
18. I check to make sure my rings fit the same way as before	1	2	3	4	5
19. I look to see if I have cellulite on my thighs when I am sitting	1	2	3	4	5
20. I lie down on the floor to see if I can feel my bones touch the floor	1	2	3	4	5
21. I pull my clothes as tightly as possible around myself to see how I look	1	2	3	4	5
22. I compare myself to models on TV or in magazines	1	2	3	4	5
23. I pinch my cheeks to measure fatness	1	2	3	4	5

The Cognitive Fusion Questionnaire (Gillanders et al., 2014)

1	2	3	4	5	6	7
Never true	Very seldom true	Seldom true	Sometimes true	Frequently true	Almost always true	Always true

1. My thought cause me distress or emotional pain	1	2	3	4	5	6	7
2. I get so caught up in my thoughts that I am unable to do the things that I most want to do	1	2	3	4	5	6	7
3. I over-analyze situations to the point where it's unhelpful to me	1	2	3	4	5	6	7
4. I struggle with my thoughts	1	2	3	4	5	6	7
5. I get upset with myself for having certain thoughts	1	2	3	4	5	6	7
6. I tend to get very entangled in my thoughts	1	2	3	4	5	6	7
7. It's such a struggle to let go of upsetting thoughts even when I know that letter go would be helpful	1	2	3	4	5	6	7

Cognitive Fusion Questionnaire-Body Image (Ferreira et al., 2014)

1. My thoughts relating to my body image cause me distress or emotional pain	1	2	3	4	5	6	7
2. I tend to get very entangled in my thoughts concerning my body or body image	1	2	3	4	5	6	7
3. I feel upset when I have negative thoughts about my body (or physical appearance)	1	2	3	4	5	6	7
4. I get very focussed on distressing thoughts about my body image	1	2	3	4	5	6	7
5. It's such a struggle to let go of upsetting thoughts about my body shape even when I know that letting go would be helpful	1	2	3	4	5	6	7
6. My thoughts regarding my body image distract me from what I'm actually doing	1	2	3	4	5	6	7
7. I get so caught up in my thoughts about my physical appearance that I am unable to do the things that I most want to do	1	2	3	4	5	6	7
8. I over-analyze my physical appearance or my body shape to the point where it's unhelpful to me	1	2	3	4	5	6	7
9. I struggle with my thoughts related to my body or physical appearance	1	2	3	4	5	6	7
10. Once I've thought about my body or body shape in an upsetting way it's difficult for me to focus on anything else	1	2	3	4	5	6	7

Eating Disorder Examination Questionnaire (EDE-Q 6.0; Fairburn & Beglin, 2008)

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all the questions. Thank you.

Questions 1 to 12: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

	ON HOW MANY OF THE PAST 28 DAYS ...	NO DAY S	1-5 DAYS	6-12 DAYS	13-15 DAYS	16-22 DAYS	23-27 DAYS	EVERY DAY
1	Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
2	Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	0	1	2	3	4	5	6
3	Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
4	Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
5	Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?	0	1	2	3	4	5	6
6	Have you had a definite desire to have a totally flat stomach?	0	1	2	3	4	5	6
7	Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
8	Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
9	Have you had a definite fear of losing control over eating?	0	1	2	3	4	5	6
10	Have you had a definite fear that you might gain weight?	0	1	2	3	4	5	6
11	Have you felt fat?	0	1	2	3	4	5	6
12	Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).

13	Over the past 28 days, how many times have you eaten what other people would regards as an unusually large amount of food (given the circumstances)?	
14	... On how many of these times did you have a sense of having lost control over your eating (at the time you were eating)?	
15	Over the past 28 days, on how many DAYS have such episodes of overeating occurred (i.e. you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?	
16	Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight?	
17	Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight?	
18	Over the past 28 days, how many times have you exercised in a “driven” or “compulsive” way as a means of controlling your weight, shape or amount of fat, or to burn off calories	

Questions 19 to 20: Please circle the appropriate number. Please note that for these questions the term “binge eating” means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

	ON HOW MANY OF THE PAST 28 DAYS ...	NO DAYS	1-5 DAYS	6-12 DAYS	13-15 DAYS	16-22 DAYS	23-27 DAYS	EVERY DAY
19	Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
		NONE OF THE TIMES	A FEW OF THE TIMES	LESS THAN HALF	HALF OF THE TIMES	MORE THAN HALF	MOST OF THE TIME	EVERY TIME
20	On what proportion of the times that you have eaten have you felt guilty (felt that you’ve done wrong) because of its effect on your shape or weight? ... Do not count episodes of binge eating.	0	1	2	3	4	5	6
			NOT AT ALL	SLIGHTLY	MODERATELY	MARKEDLY		

21	Over the past 28 days, how concerned have you been about other people seeing you eat? (Do not count episodes of binge eating)	0	1	2	3	4	5	6
-----------	---	---	---	---	---	---	---	---

In the past 28 days...

		NOT AT ALL	SLIGHTLY		MODERATELY		MARKEDLY	
22	Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
23	Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
24	How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?	0	1	2	3	4	5	6
25	How dissatisfied have you been with your weight?	0	1	2	3	4	5	6
26	How dissatisfied have you been with your shape?	0	1	2	3	4	5	6
27	How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	0	1	2	3	4	5	6
28	How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	0	1	2	3	4	5	6

Religious Commitment Inventory-10 (Worthington et al., 2003)

1	2	3	4	5
Not at all true of me	Somewhat true of me	Moderately true of me	Mostly true of me	Totally true of me

1. I often read books and magazines about my faith	1	2	3	4	5
2. I make financial contributions to my religious organization	1	2	3	4	5
3. I spend time trying to grow my understanding of my faith	1	2	3	4	5
4. Religion is especially important to me because it answers many questions about the meaning of life	1	2	3	4	5
5. My religious beliefs lie behind my whole approach to life	1	2	3	4	5
6. I enjoy spending time with others of my religious affiliation	1	2	3	4	5
7. Religious beliefs influence all my dealings in life	1	2	3	4	5
8. It is important to me to spend periods of time in private religious thought and reflection	1	2	3	4	5
9. I enjoy working in the activities of my religious affiliation	1	2	3	4	5
10. I keep well informed about my local religious group and have some influence in its decisions	1	2	3	4	5

Appendix L - Mood repair task**Mood repair task:**

Please describe three things that are you grateful for:

- 1)
- 2)
- 3)

Thank you for taking part in this study.

Appendix M - Debrief Form



Debriefing Form

Study Title: Exploring the relationship between body checking, body image-related cognitive fusion and eating disorder psychopathology in Muslim women

Ethics/ERGO number: 89852

Researcher(s): Sarah Johnson, Katy Sivyier, Kate Willoughby

University email(s): sj10n22@soton.ac.uk

Version and date: Version 1 05.04.24

Thank you for taking part in our research project. Your contribution is very valuable and greatly appreciated.

Purpose of the study

The aim of this research was to investigate relationships between body checking behaviour, body-image related thoughts and eating disorder symptoms in Muslim women. The study also wanted to explore whether religiosity and the practice of veiling is associated with body checking, body image-related thoughts and eating disorder symptoms. The researchers were interested in developing a better understanding of possible patterns between religiosity and the practice of veiling as a protective 'buffer' for eating disorder symptoms. Through its focus on Muslim women and in particular, religiosity and the practice of veiling, this project hoped to address the current underrepresentation of Muslim women in eating disorder research.

Confidentiality

Results of this study will not include your name or any other identifying characteristics. Your data will remain confidential. Your participation will remain anonymous unless you provide an email address for entry into the prize draw to win one of the five Amazon gift vouchers. If you opt-in to this, you acknowledge that your participation in the study will no longer be anonymous. However, your e-mail address will not be linked to any of your responses.

Study results

If you would like to receive a summary of the research findings, please click on a link at the bottom of this form which will take you to a separate survey to collect your contact details.

Further support

If taking part in this study has caused you discomfort or distress, you can contact the following organisations for support:

Ethics/ERGO number: 89852 Version: 1

- BEAT Eating Disorders <https://www.beateatingdisorders.org.uk>
 - BEAT's helpline (**0808 801 0677**) is open 365 days a year from 1pm – 9pm during the week, and 5pm–9pm on weekends and bank holidays.
- Samaritans' helpline (**116 123**) is open 365 days a year, 24 hours a day.
- You may also wish to contact your GP with any concerns that you may have for your mental or physical wellbeing.

Further reading

If you would like to learn more about this area of research, you can refer to the following resources:

- Mussap, A. J. (2009). Strength of faith and body image in Muslim and non-Muslim women. *Mental Health, Religion and Culture*, 12(2), 121-127.
- Wilhelm, L., Hartmann, A. S., Becker, J. C., Kişi, M., Waldorf, M., & Vocks, S. (2018). Body covering and body image: a comparison of veiled and unveiled muslim women, christian women, and atheist women regarding body checking, body dissatisfaction, and eating disorder symptoms. *Journal of Religion and Health*, 57, 1808-1828.
- Kolsoom, N. P., Farid, A. A., & Abolghasemi, S. (2013). Investigation of Relationship between Thoughts Fusion, its Components and Worry and Eating Disorders in Women. *Eating disorders*, 81(15.72), 1.

Further information

If you have any concerns or questions about this study, please contact Sarah Johnson at sj10n22@soton.ac.uk who will do their best to help.

If you remain unhappy or would like to make a formal complaint, please contact the Head of Research Integrity and Governance, University of Southampton, by emailing: rgoinfo@soton.ac.uk, or calling: + 44 2380 595058. Please quote the Ethics/ERGO number which can be found at the top of this form. Please note that if you participated in an anonymous survey, by making a complaint, you might be no longer anonymous.

Thank you again for your participation in this research.

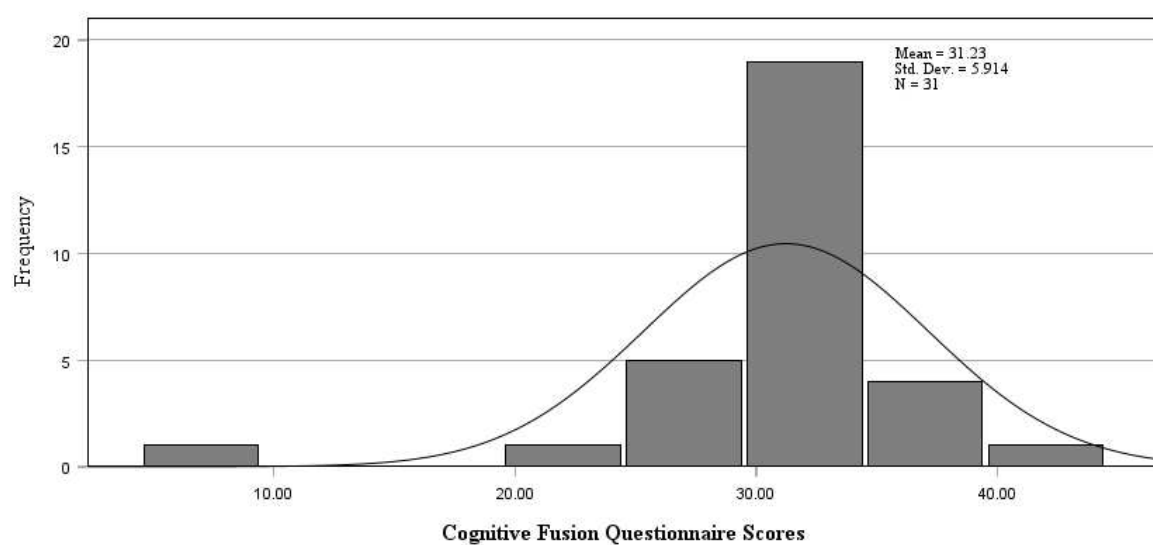
Appendix N - Histograms presenting distribution of scores on Body Checking, Cognitive Fusion and Cognitive Fusion-Body Image Questionnaires

Bar plots 1-3

Normal distributions for (n=31) participants that scored above clinical cut-off on Global Eating Disorder-Examination Questionnaire and below median (30) on the Religious Commitment Inventory

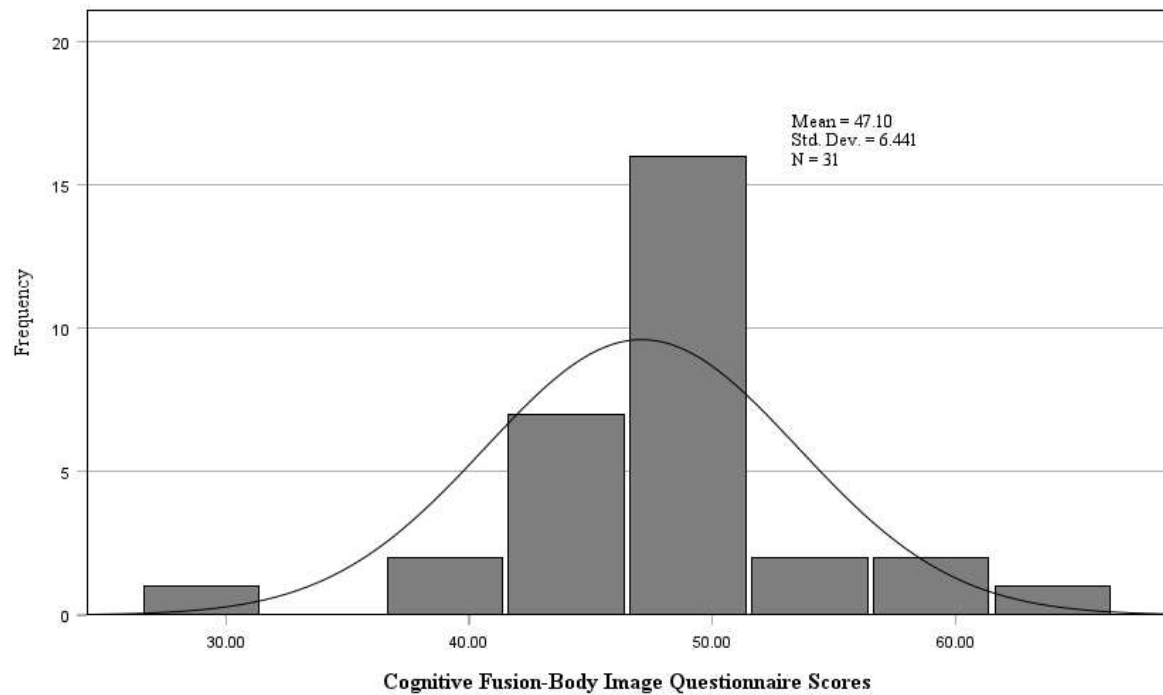
Plot 1

Distribution of scores on the Cognitive Fusion Questionnaire

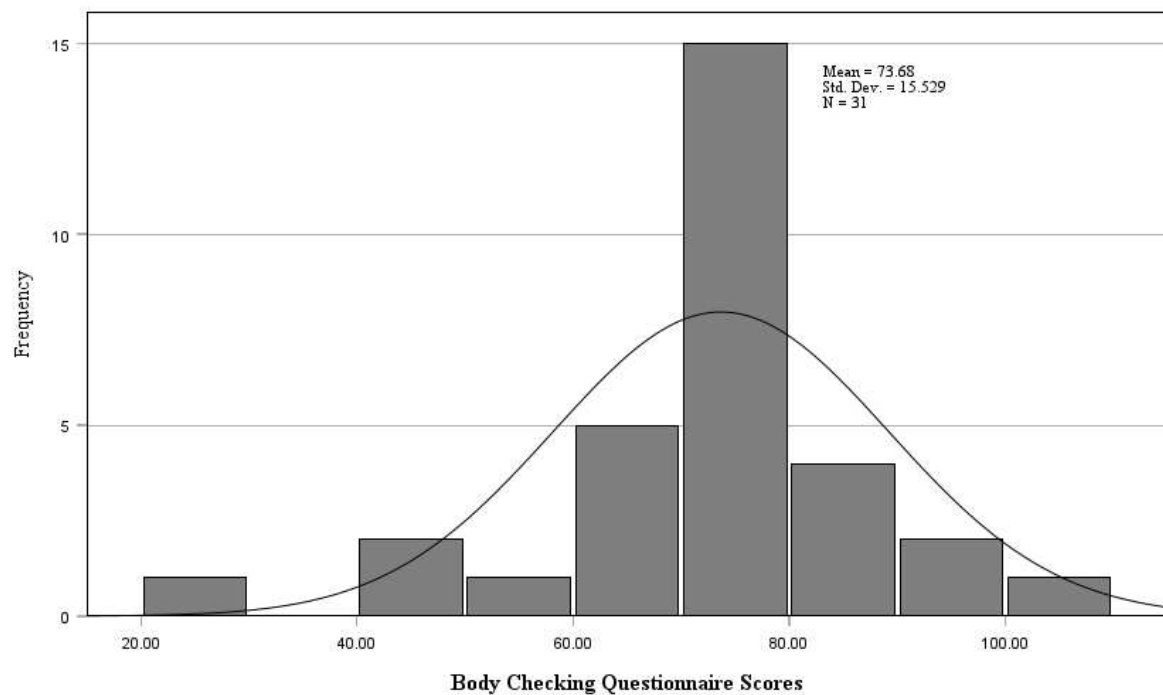


Plot 2

Distribution of scores on Cognitive Fusion Questionnaire-Body Image

**Plot 3**

Distribution of scores on Body Checking



Plot 4

Bimodal distributions of global Eating Disorder Examination-Questionnaire scores for veilers and non-veilers

