Measuring early maladaptive schemas (EMS): Preliminary development of a brief Young Schema Questionnaire (YSQ-Brief)

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Abstract

Objective: Although the Young Schema Questionnaire and its current variants have been widely used, its continued use would be strengthened practically if a briefer version was available for clinical assessment and research. This study aimed to provide an assessment of the psychometric properties of the original YSQ-S3 and to create a brief version (YSQ-Brief) with equal or superior psychometric properties to the YSQ-S3.

Methods: A non-clinical sample of university students ($N = 800$) completed an online test battery of questionnaires. Diagnostic groups were created based off current self-report of a mental health diagnosis (e.g., generalised anxiety disorder, major depressive disorder), and an ED-symptomatic subgroup created based off Eating Disorder Examination Questionnaire scores. Psychometric evaluations were conducted, including confirmatory factor analyses, internal consistency and validity analyses (criterion and construct). Further, group differences and relationships between mental health symptomatology and EMS were examined.

Results: Both the YSQ-S3 and the revised YSQ-Brief displayed good model fit. Further, using both measures, all 18 EMS dimensions displayed acceptable to excellent internal consistency, good construct validity, ability to discriminate between diagnostic groups, and relationships with depression, anxiety, stress, and eating disorder symptomatology.

Conclusions: The results of this study suggest that both the YSQ-S3 and the revised YSQ-Brief are valid, reliable and clinically useful measures. However, the YSQ-Brief provides greater efficiency and reduced burden, as well as equal psychometrical soundness as compared to the original measure.

Keywords: early maladaptive schemas, measurement, assessment, psychometric, symptoms

Key Points:

- The Young Schema Questionnaire is widely used, but has significant clinician and respondent burden
- A psychometric evaluation of the YSQ-S3 is yet to be conducted in a young adult Australian sample
- The relationship between anxiety and schema dimensions has not been studied in this population, nor the relationship between disordered eating symptomatology 'approval seeking', 'negativity/pessimism', and 'punitiveness'
- The YSQ-S3 displayed good validity and reliability in young adult Australian population

- The newly revised YSQ-Brief displayed equal psychometrical soundness, but with greater efficiency and reduced burden
- The YSQ-Brief can discriminate young adults with various self-reported mental health diagnoses and displayed relationships with depression, anxiety, stress, and eating disorder symptomatology

Measuring early maladaptive schemas (EMS): Preliminary development of a brief

Young Schema Questionnaire (YSQ-Brief)

Schemas are understood as a set of deeply held, pervasive and persistent beliefs (conditional or unconditional) about the self, others or the world (Beck et al., 1990; Young et al., 2003). Beck (1976) originally proposed that early negative life experiences are central to the formation of these beliefs, and as such the cognitive content of such beliefs were often negative, maladaptive or dysfunctional. Young (1994) extended this idea by introducing the concept of early maladaptive schemas (EMS); stable, cognitive structures that serve to influence an individual's interpretation of themselves and their environment. EMS are proposed to form early in life and grow with individuals' experiences, acting like a filter through which they see the world, and thus how they perceive and respond to events (Young et al., 2003). The activation of EMS by events (related to their origin) are theorised to contribute to the development of psychological distress and disorders (Young et al., 2003). Schema-focussed therapy was originally conceived as an integrative, cognitive treatment for personality disorders (PDs; Young, 1994). Since then, schema theory and therapy has been applied to and utilised across varied psychological disorders, such as depression (Carter et al., 2013; Körük & Ozabaci, 2018), anxiety (Eftekari & Bakhtiari et al., 2022; Peeters et al., 2022; Remmerswaal et al., 2023), and in eating disorders (EDs; Maher et al., 2022; Pugh, 2015; Joshua et al., 2023).

Assessing EMS

There are several important considerations when it comes to the measurement of EMS including the psychometric properties, efficiency and accessibility, and content of the measure utilised. The Young Schema Questionnaire (YSQ) is the main tool utilised by schema therapists to assess EMS, although there are several versions of the YSQ currently available. These include the versions devised by Young and colleagues; Young Schema Questionnaire Long Form Version 3 (YSQ-L3; 232 items assessing 18 EMS dimensions; Young et al., 2003) and the Young Schema Questionnaire Short Version 3 (YSQ-S3; 90 items assessing 18 EMS dimensions; Young & Brown, 2005), and a recently developed YSQ-R (Yalcin et al., 2021), containing 116 items assessing 20 EMS dimensions. Other research has assessed five broad schema domains, which categorises several EMS domains (Young et al., 2003). These schema domains include disconnection/rejection, impaired autonomy, impaired limits, other-directedness, and over vigilance and inhibition (Young et al., 2003; Siahmoshtei et al., 2021). One advantage to measuring EMS using these broader domains may be reduced redundancy and covariance between EMS scales. However, this

approach potentially provides less specificity whilst examining an individual's schema profiles and in using specific EMS as therapeutic targets.

Although there are benefits to the use of each YSQ variant, the YSQ-S3 has been commonly used in research settings in the last decade (Bishop et al., 2022; Maher et al., 2022). It measures the following 18 EMS; 'emotional deprivation', 'abandonment/instability', 'mistrust/abuse', 'social isolation/alienation', 'defectiveness/shame', 'failure to achieve', 'dependence/incompetence', 'vulnerability to harm', 'enmeshment', 'subjugation', 'self-sacrifice', 'emotional inhibition', 'unrelenting standards', 'entitlement /grandiosity', 'insufficient self-control', 'approval seeking', 'negativity/pessimism', and 'punitiveness' (Young & Brown, 2005). For example, a defectiveness/shame schema may be characterised by beliefs that one is flawed, unlovable, or unacceptable to others based off their perceived flaws (e.g., 'I feel like I'm not lovable'). A self-sacrifice schema describes the belief that one must excessively meet the needs of others at the expense of their own needs (e.g., 'I've always been the one who listens to everyone else's problems'), and a subjugation schema is characterised by the belief or feeling that one must surrender control to avoid punishment, abandonment or anger from others (e.g., 'I have a lot of trouble demanding that my rights be respected and that my feelings be taken into account').

Advantages of utilising the YSQ-S3 include the increased efficiency in both research and clinical settings, compared to the longer versions, whilst measuring the same 18 established EMS. However, variation in its psychometric properties exist in this YSQ iteration cross-culturally, including item cross-loading, variability in factor structure, and poor model fit and validity (Bach et al., 2018; Kriston et al., 2013; Slepecky et al., 2019). It has been suggested to demonstrate caution and to carefully examine the relevance of each EMS to each specific disorder, as each EMS possesses varied evidence of predictive validity for different symptomatology, disorders, and this is even more varied between populations (Oei & Baranoff, 2007). Furthermore, although it is one of the shorter available YSQ variants, a 90-item assessment tool in psychological research and clinical practice presents a significant burden for the respondents, researchers and clinicians. Overall, although the YSQ-S3 has been widely used, it would indeed be clinically useful to be able to assess all 18 established EMS dimensions, but with reduced burden and even greater efficiency.

EMS and Psychological Disorders and Symptomatology

Extensive evidence outlines the relationships between EMS and various psychological disorders and symptomatology (Thimm & Chang, 2022). The theoretical and empirical

relationships between the EMS and PDs have been well-established (Panagiotopoulos et al., 2023; Young et al., 2003). However, since the initial development of schema theory and therapy, the presence of maladaptive schemas has also been investigated in and considered a strong vulnerability factor for the development and maintenance of different mental health conditions, such as depression, anxiety disorders and also EDs (Körük & Ozabaci, 2018; Maher et al., 2022; Peeters et al., 2022).

A recent systematic review and meta-analysis examined the relationship between EMS and depression in adults (Bishop et al., 2022). The meta-analysis indicated significant positive relationships between all 18 EMS and depression symptom scores, with the largest effect sizes for 'social isolation' and 'defectiveness/shame' (Bishop et al., 2022). Moreover, two other meta-analyses identified the strongest relationships between both depression and anxiety, and EMS were in the schema domains of disconnection and rejection ('abandonment/instability', 'mistrust/abuse', 'emotional deprivation', 'defectiveness/shame', 'social isolation/alienation'), impaired autonomy ('dependence/incompetence', 'vulnerability to harm or illness', 'enmeshment'), and other-directedness ('subjugation', 'self-sacrifice', 'approval seeking'; Tariq, Reid et al., 2021; Tariq, Quayle et al., 2021). However, these meta-analytic reviews also acknowledged the high heterogeneity in research outcomes due to the use of different variants of the YSQ (e.g., YSQ-S3, YSQ-L3, YSQ-Short Form [YSQ-SF], YSQ-Adolescent), with those using older versions of the YSQ (e.g., YSQ-SF) not assessing all 18 established EMS (Bishop et al., 2022; Tariq, Reid et al., 2021; Tariq, Quayle et al., 2021).

In terms of the relationships between EMS and ED symptomatology, the available literature suggests EMS dimensions have differing relationships with ED symptoms and diagnostic profiles (Maher et al., 2022). For example, 'emotional inhibition' has displayed the most rigorous evidence for its relationship with binge eating, across disorders (AN-BP, BN, and BED; Pugh, 2015). Evidence also supported strong relationships between 'defectiveness/shame' and 'emotional deprivation' and compensatory behaviours (Pugh, 2015). Less consistent and robust relationships were reported with restrictive behaviours, with only some studies reporting associations with 'dependence/ incompetence', and 'emotional inhibition'. A recent systematic review of 29 studies examined the relationship between EMS and EDs and ED symptomatology in adult populations (Maher et al., 2022). Perhaps not surprisingly, there was evidence for higher 'insufficient self-control' beliefs for individuals with eating disorders characterised by binge eating or compensatory behaviours, compared to those displaying greater restricting behaviours (Maher et al., 2022). 'Unrelenting

standards' was the only EMS dimension to display an association with all ED diagnoses (anorexia nervosa [AN], bulimia nervosa [BN], binge eating disorder [BED], other specified feeding or eating disorder [OSFED]). In those with BED, included studies only indicated higher 'unrelenting standards' and 'emotional inhibition' compared to control groups.

However, as Pugh (2015) also described, when examining the relationships with specific ED symptomatology (including restriction, drive for thinness, binge eating, compensatory behaviours, and body dissatisfaction), evidence only existed to support the correlation between restriction and 'unrelenting standards' (Maher et al., 2022). The systematic review also indicated that there was no existing evidence to support the relationship between 'vulnerability to harm', 'entitlement', 'subjugation', 'self-sacrifice', 'approval seeking', 'negativity/pessimism', and 'punitiveness' and ED symptomatology (Maher et al., 2022). Furthermore, the two existing studies that examined these relationships in Australian samples utilised either the original YSQ or the YSQ-SF (de Paoli et al., 2017; George et al., 2004). Further, de Paoli et al. (2017) only examined 'emotional deprivation', 'abandonment', 'mistrust/abuse', 'social isolation', and 'defectiveness' EMS. Thus, the relationship between disordered eating symptomatology and three EMS, 'approval seeking', 'negativity/pessimism', and 'punitiveness', have not yet been studied in an Australian population. The variability in versions of the YSQ utilised between studies may also then explain the lack of evidence for certain EMS across ED symptomatology.

Thus, it is important to conduct this examination, in conjunction with a thorough evaluation of the psychometric properties of the YSQ-S3 in a young Australian sample, including investigating its factor structure, validity, reliability and clinical utility. To the best of the author's knowledge, an extensive psychometric evaluation and validation of the YSQ-S3 is yet to be conducted in this particular population. It is important that assessment tools have evidence for their psychometric soundness in all populations in which they are utilised.

Current Study

It is clear from existing empirical literature that the YSQ and its variants have been widely utilised to measure EMS and their relationship to various psychological disorders and symptomatology, including internalising symptoms and ED symptoms. However, it is important to continue to address some of the gaps in empirical literature concerning the relationships between EMS dimensions and varied psychological disorders and symptom profiles. A comprehensive psychometric evaluation of the YSQ-S3 is yet to be conducted in a young adult Australian sample. Moreover, the relationship between anxiety and EMS dimensions has not been assessed in this population, nor has the relationship between

disordered eating symptomatology and three EMS ('approval seeking', 'negativity/pessimism', and 'punitiveness').

It is also essential to continue to attempt to improve overall assessment of EMS. Although the YSQ and its current variants have been widely used, its continued use would be strengthened practically if a briefer version was available for clinical assessment and research. Ideally, a brief YSQ would contain equal or superior psychometric properties to the original measure but would instead allow for reduced respondent, researcher and clinician burden. That is, a brief, psychometrically sound version, that is valid, reliable, clinically useful, but has higher clinical utility to due increased efficiency and accessibility. It is also important that a brief YSQ can continue to discriminate between diagnostic groups/categories, and indeed demonstrates relationships between EMS dimensions and varied psychological symptomatology.

Given this, the current study intends to address the following aims in a sample of young Australians. Firstly, we aimed to evaluate the factor structure and psychometric properties of the YSQ-S3, including performing a confirmatory factor analysis (CFA), examining internal consistency, convergent validity, and floor and ceiling effects. We also aimed to examine schema differences between various groups (e.g., from self-reported current mental health diagnoses), as well as examining the relationships between EMS dimensions and varied psychological symptomatology (internalising and ED symptoms). Additionally, we aimed to create a preliminary, revised, brief version of the YSQ (YSQ-Brief), with equal or superior psychometric properties to the original YSQ-S3, and examine group differences and the relationships between EMS dimensions and varied psychological symptomatology, using the revised YSQ-Brief.

Method

Participants

Participants were a convenience sample of undergraduate psychology students, recruited through the University of Sydney's online psychology research participation system and voluntarily participated in exchange for course credit. From a larger dataset, a total of 800 students completed the questionnaire of interest (YSQ-S3), and therefore were included in analyses (74.9 % female; mean age = 20.44 years, SD = 4.44 years; 55.3% Asian, 30.5% Caucasian, 9.8% Other, 3.4% Middle Eastern, 1% Indigenous Australian). In order to obtain sufficient statistical power for a confirmatory factor analysis (CFA), we obtained the minimum sample sizes suggested from several simulation studies, guidelines for scale

development and proposed quality criteria for measurement properties of health status questionnaires (Carpenter, 2018; Mundfrom et al., 2005; Terwee et al., 2007).

Participants were asked to self-report any current mental health (MH) diagnoses, which were used to examine group differences. Differences were examined between those who reported any current (at the time of data collection) MH diagnosis(es) (n = 189 [23.6%]; 82.0% female; M_{age} = 20.70, SD = 4.16) and those who reported they did not have any current diagnosis(es) (n = 611 [76.4%]; 72.7% female; M_{age} = 20.36, SD = 4.53), as well as between those with a generalised anxiety disorder (GAD) diagnosis (n = 98 [12.4%]; 90.8% female; M_{age} = 20.70, SD = 5.27) versus those without (n = 702 [87.6%]; 72.6% female; M_{age} = 20.40, SD = 4.32), and between those with a major depressive disorder (MDD) diagnosis (n = 54 [6.8%]; 85.2% female; M_{age} = 20.83, SD = 3.54) versus those without (n = 746 [93.2%]; 74.1% female; M_{age} = 20.41, SD = 4.50). Although other current mental health diagnoses were reported in the sample (e.g., obsessive compulsive disorder [OCD], bipolar disorder), subgroups were not large enough to conduct meaningful statistical analysis.

A putative ED-symptomatic subgroup of participants (n = 197 [24.6%]; 88.8% female; M_{age} = 19.69, SD = 2.16) was created based off self-reported outcomes from the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994), and compared to a non-ED group (n = 603 [75.4%]; 70.3% female; M_{age} = 20.68, SD = 4.94). As per methodology utilised in previous studies, this criterion was used with the intention of representing individuals with both clinical and sub-clinical (or prodromal) symptomatology, and other specified feeding and eating disorders (OSFED). Thus, in line with prior research (Hatoum et al., 2022a; Hatoum et al., 2022b; Ro et al., 2015), a global EDE-Q score of 2.5 or higher was used as a cut-off criterion for those considered ED-symptomatic.

Measures

Depression Anxiety Stress Scales 21 (DASS-21)

The DASS-21 examines depression, anxiety and stress, with 7 items measuring each subscale (Lovibond & Lovibond, 1995). Participants were asked to rate items according to how much each statement applied to them over the past week on a scale of 0 *(Did not apply to me at all)* to 3 *(Applied to me very much or most of the time;* (e.g., 'I felt that I was rather touchy'). The overall DASS-21 and its three subscales all demonstrated good internal consistency (Ω = .84 to .94) in the present study.

Eating Beliefs Questionnaire 18 (EBQ-18)

The EBQ-18 self-report questionnaire that examines meta-cognitive beliefs about eating. This includes positive (six items: e.g., 'It won't make a difference if I eat more'),

negative (six items: e.g., 'If I don't control myself, I would never stop eating'), and permissive beliefs (six items: e.g., 'Bingeing is something I can have for myself') about food and eating in the absence of hunger (Burton & Abbott, 2018). Items are rated on a scale from *Strongly disagree* (1) to *Strongly agree* (5). It has been found to be valid, reliable and clinically useful (Burton et al., 2018). The three subscales and the overall EBQ-18 demonstrated good internal consistencies in our sample (Ω = .85 to .92).

Eating Disorder Core Beliefs Questionnaire Revised (ED-CBQ-R)

The ED-CBQ-R is a 15-item self-report measure that assesses core beliefs relating to EDs (Hatoum et al., 2022). It contains four subscales, reflecting four dimensions of core beliefs; self-loathing, unassertive/inhibited, demanding/needing help and support, and abandoned/isolated. Items (e.g., 'selfish') are rated on a 7-point scale (*Feels very much untrue* [1] to *Feels very much true* [7]), where higher scores reflect higher ED core beliefs. The ED-CBQ-R has previously demonstrated good internal consistency (α/Ω = .73 to .92) and construct validity (Hatoum et al., 2022a; Hatoum et al., 2022b), as well as the ED-CBQ-R and each of its four subscales in the present study (Ω = .78 to .91).

Eating Disorder Examination Questionnaire (EDE-Q)

The EDE-Q is a 28-item questionnaire assessing the frequency and severity of ED symptoms experienced and self-reported throughout the month prior to assessment (Fairburn & Beglin, 1994). To measure eating disorder symptomatology and create putative diagnostic groups, we utilised its four subscales which examined dietary restraint, eating concerns, weight concerns and shape concerns. A higher global score on the four subscales reflects a greater frequency and severity of symptoms. Items were rated on a 7-point scale (*No days* [0] to *Every day* [6]). The global EDE-Q score and its four subscales demonstrated good internal consistency in this sample (Ω = .84 to .96). Item 13 was additionally utilised to measure binge eating, and a combined score from items 16, 17 and 18 was utilised to measure compensatory behaviours.

Young Schema Questionnaire Short Version 3 (YSQ-S3)

The YSQ-S3 is a 90-item self-report measure that assesses 18 different EMS dimensions (Young, 2005). Each EMS dimension forms one subscale: 'emotional deprivation', 'abandonment/instability', 'mistrust/abuse', 'social isolation/alienation', 'defectiveness/shame', 'failure to achieve', 'dependence/incompetence', 'vulnerability to harm', 'enmeshment', 'subjugation', 'self-sacrifice', 'emotional inhibition', 'unrelenting standards', 'entitlement /grandiosity', 'insufficient self-control', 'approval seeking', 'negativity/pessimism', and 'punitiveness'. This questionnaire asks participants to rate

statements (e.g., 'I feel that I'm not loveable') based on how accurately they fit, and based off what they 'emotionally feel', not what they 'think to be true'. Items were rated on a 6-point scale (*Completely untrue of me* [1] to *Describes me perfectly* [6]), where higher scores on each subscale reflect higher presence of EMS.

Procedure

All data utilised in this study was a part of a larger dataset and larger project approved by the University of Sydney Human Research Ethics Committee (Project Number: 2022/856). All participants were provided with a participant information statement. After informed consent was obtained, participants voluntarily completed an online test battery of questionnaires using Qualtrics Survey Software in exchange for course credit. The test battery included measures described in the measures section and demographic information.

Statistical Analyses

Statistical analyses were carried out using IBM Statistical Package for Social Sciences (SPSS) Statistics (version 26.0) predictive analytics software and confirmatory factor analyses (CFAs) were conducted in R Project for Statistical Computing (R Core Team 2023). Data distribution was examined for all variables to assess for violations of normality assumptions and descriptive statistics reported. Floor and ceiling effects were examined and reported if >15% of participants reported either the highest or lowest possible scores on each scale or subscale (Terwee et al., 2007). Internal consistency of scales utilised were assessed using McDonald's Omega (Ω) (values > .70 and < .95 were considered acceptable; Dunn et al., 2014; Terwee et al., 2007). To examine construct validity and intersubscale correlations, Kendall's Tau (τ) correlations were used. The ED-CBQ-R and EBQ-18 were used to assess convergent validity. As suggested by Terwee et al. (2007), Mokkink et al. (2010), and Modini et al. (2015), the original version of the measure may be used as a 'gold standard' to assess the criterion validity of a brief or revised version against. Thus, criterion validity was measured by assessing the correlation between the YSQ-S3 and the revised, brief measure (YSQ-Brief).

CFAs were conducted using weighted least squares with a mean and variance adjusted test statistic (WLSMV) as the estimation method. This method was utilised as it provides the best option for modelling categorical (ordinal) data, due to its use as a robust estimator which does not assume normally distributed variables (Child, 2006; Rhemtulla et al., 2012; Sellbom & Tellegen, 2019). There were no missing values. The following values were utilised to evaluate model fit: comparative fit index (CFI) of $\geqslant$ .95 good and $\geqslant$ .90 acceptable, a χ^2/df value of $\leqslant$ 2.00 good and $\leqslant$ 3.00 acceptable, and an

RMSEA value of $\leqslant$ .050 good and $\leqslant$ .080 acceptable (Hu & Bentler, 1999; Jackson et al., 2009; Marsh et al., 2004; Schreiber et al., 2006).

Welch's *t*-tests were used to examine differences in EMS between diagnostic groups (MH diagnosis, GAD, MDD) and those without, and between the ED-symptomatic and non-ED subgroups, where equal variances are not assumed and to account for differences in sample sizes in subgroups (Delacre et al., 2017). To examine relationships between each EMS and both internalising and ED symptomatology, linear regression analyses were used to examine which EMS subscales predicted stress, anxiety and depression, as well as different ED symptom profiles, using the four EDE-Q subscales, and EDEQ items reflecting binge eating and compensatory behaviours.

Results

Confirmatory Factor Analyses

YSQ-S3

To evaluate the factor structure of the YSQ-S3, an initial CFA was conducted in R using WLSMV estimation. In accordance with the previously outlined cut-off values (see Method), the 18-factor structure of the YSQ-S3 demonstrated a good fit to the observed data (See Table 1). All items loaded adequately onto their intended factor ($\beta > 0.40$; Carpenter, 2018). See Supplementary Table 1 for factor loadings and McDonald's Ω if item was removed.

YSQ-Brief

In alignment with the second outlined aim of this study, a brief, revised version of the YSQ-S3 was developed and named the YSQ-Brief. This aim was to create a version of the YSQ that would retain its clinical utility and usefulness in measuring all 18 EMS, and thus to retain its 18-factor structure, but with reduced burden through reduced items per subscale.

Several models were tested during this process. Decisions for item retention was dependent on model fit indices, standardised regression coefficients (factor loadings), McDonald's Ω if item was removed, and finally theoretical judgement and item wording. In accordance with best practice guidelines (Carpenter, 2018), the minimum of three items per subscale were retained. The resultant model was an 18-factor, 54 item measure, which contained three items per EMS subscale. This model also displayed similarly good fit to the observed data (See Table 1), and all items loaded adequately onto their intended factor ($\beta > 0.50$; Carpenter, 2018). See Supplementary Table 1 for factor loadings for the YSQ-Brief.

(Insert Table 1 here)

Internal Consistency

YSQ-S3

All EMS had acceptable to excellent internal consistency (ranging from $\Omega = .70$ to $\Omega = .92$). The total YSQ-S3 displayed an extremely high internal consistency ($\Omega = .98$), which suggests some redundancy in items and need to examine covariance between EMS subscales (Streiner, 2003; Terwee et al., 2007). Table 2 displays all internal consistencies.

YSQ-Brief

Similarly, for the YSQ-Brief, all new EMS subscales displayed acceptable to excellent internal consistency ($\Omega = .70$ to $\Omega = .88$), with the total YSQ-Brief displaying very high internal consistency ($\Omega = .96$; See Table 2).

(Insert Table 2 here)

Construct Validity and Subscale Intercorrelations

YSQ-S3

The total YSQ-S3 and all EMS subscales were all significantly positively correlated with the EDCBQ-R and EBQ-18 and their respective subscales, suggesting good convergent validity (See Table 3). All EMS subscales were significantly positively correlated with each other ($\tau = .13**$ to $.61**$).

YSQ-Brief

Similarly, the YSQ-Brief and all EMS subscales displayed significant positive correlations with all included scales and subscales, supporting the convergent validity of the new measure (Table 3). All revised EMS subscales were significantly positively correlated with each other ($\tau = .08**$ to $.57**$).

(Insert Table 3 here)

Criterion Validity

The YSQ-S3 displayed a significant, strong positive correlation with the YSQ-Brief ($\tau = .94**$), suggesting the YSQ-Brief displays good criterion validity.

Descriptive Statistics

YSQ-S3

A series of Shapiro-Wilk tests revealed that the YSQ-S3 and each of the EMS variables were not normally distributed (*ps* <.001). Using the Terwee et al. (2007) criteria to examine floor and ceiling effects, no EMS subscales displayed floor or ceiling effects, except 'enmeshment', for which 16% of participants had the lowest possible score. See Table 4 for descriptive statistics in the full sample, ED-symptomatic and non-ED subgroups, for those with a self-reported mental health diagnosis and those without, for those with a self-reported GAD diagnosis and those without, and for those with a MDD diagnosis and those without.

YSQ-Brief

The YSQ-Brief and EMS variables were not normally distributed (ps <.001). Very few EMS subscales displayed floor or ceiling effects, except the following subscales where more than 15% of participants had the lowest possible score; 'defectiveness/shame' = 17.8%, 'incompetence/dependence' = 16.3%, and 'enmeshment' = 21.4%. See Table 4 for all descriptive statistics.

Group Differences

YSQ-S3

A series of Welch's *t*-tests were conducted to determine if the YSQ-S3 and EMS subscales could differentiate between those with any mental health diagnoses and those without, those with a MDD diagnosis compared to those without, those with a GAD diagnosis compared to those without, and between the ED-symptomatic and non-ED subgroups. Results indicated that for all EMS subscales and the total YSQ-S3, participants with a current self-reported MH diagnosis(es) had higher scores compared to those without any diagnosis(es), those with a current self-reported GAD diagnosis had higher scores than those without, and those with a current self-reported MDD diagnosis had higher scores compared to those without. The only exception was that there was no significant difference between those with a GAD diagnosis and those without on the 'entitlement/grandiosity' EMS subscale. Further, participants in the ED-symptomatic subgroup reported significantly higher scores than those in the non-ED subgroup on the total YSQ-S3 and on all EMS subscales. See Table 5 for all inferential statistics.

YSQ-Brief

A series of Welch's *t*-tests revealed a similar pattern to that of the YSQ-S3. For all revised EMS subscales and the total YSQ-Brief, participants in the ED-symptomatic group scored significantly higher than those in the non-ED group, those in the MH diagnosis group scored significantly higher than those in the no diagnosis group, those with GAD scored significantly higher than those in the no GAD group, and those with MDD scored significantly higher than those in the no MDD group. However, only the 'entitlement/grandiosity' EMS subscale displayed no significant difference between MH, GAD, and MDD groups and their respective comparison groups. See Table 5 for all inferential statistics.

Relationships between Mental Health Symptomatology and EMS

YSQ-S3

A series of linear regression analyses demonstrated that higher EMS scores significantly predicted higher levels of depression, anxiety, stress, and greater eating concerns, weight concerns, shape concerns, restraint and compensatory behaviours for all 18 EMS (ps <.05). Higher EMS scores predicted greater objective binge eating (ps <.05), except 'emotional deprivation' (β = .02, SE = .18, p = .42) and 'emotional inhibition' (β = .05, SE = .19, p = .17). See Supplementary Table 2 and 3 for all standardised regression coefficients (β) and ps.

YSQ-Brief

On the YSQ-Brief, higher EMS scores also significantly predicted higher levels of depression, anxiety, stress, and greater eating concerns, weight concerns, shape concerns and restriction for all 18 EMS (ps <.05). Higher EMS scores predicted greater compensatory behaviours (ps <.05), except 'approval seeking' (β = .06, SE = .21, p = .08). Higher scores on most EMS dimensions predicted greater objective binge eating (ps <.05), except 'emotional deprivation' (β = .02, SE = .17, p = .62), 'emotional inhibition' (β = .06, SE = .17, p = .12), 'defectiveness/shame' (β = .06, SE = .17, p = .11), 'failure to achieve' (β = .05, SE = .15, p = .13), 'enmeshment' (β = .05, SE = .19, p = .20), 'unrelenting standards' (β = .05, SE = .18, p = .15), and 'punitiveness' (β = .05, SE = .17, p = .20). See Supplementary Table 2 and 3 for all βs and ps.

Discussion

A psychometric evaluation of the YSQ-S3 was conducted and after a comprehensive assessment of its validity, reliability, and factor structure, a brief version of the original measure was developed (YSQ-Brief). We further aimed to examine the YSQ-S3 and the YSQ-Brief and all EMS subscales, and their relationships with various psychological disorders and MH symptomatology.

This study was the first to comprehensively evaluate the psychometric properties of the YSQ-S3 in a young adult Australian population. In contrast to some previous findings that have indicated poor model fit and validity (Bach et al., 2018; Kriston et al., 2013; Slepecky et al., 2019), we found support for the 18-factor model of the YSQ-S3 (90-items), convergent validity, as well as adequate to good internal consistency on the overall scale and subscales. This validation of its factor structure, reliability and validity support its ongoing clinical utility in this population. It is essential for empirical evidence to provide ongoing support for the psychometric soundness of an assessment tool for each population in which it is used. Importantly, this evaluation allowed us to develop the YSQ-Brief, and ensuring the revised measure possessed at least equal (or superior) properties to that of the YSQ-S3. This

study presented the preliminary development of a revised 18-factor YSQ-Brief (54-items; three items per subscale). The YSQ-Brief possessed model fit indices equal or superior to that of the YSQ-S3, as well as adequate to excellent internal consistency on the overall measure and EMS subscales, good convergent validity and excellent criterion validity. These findings provide evidence of the promising benefits of YSQ-Brief as a more accessible, efficient measure of the same 18 EMS dimensions, as compared to the YSQ-S3, whilst maintaining psychometric validity and reliability.

It was also critical to test the ability of both measures to discriminate between putative diagnostic groups, and to examine if EMS dimensions demonstrate the ability to predict various psychological symptomatology (Oei & Baranoff, 2007). Both the YSQ-S3 and YSQ-Brief were used to assess for differences between groups in the current study. Both measures discriminated between putative diagnostic groups, with those in the ED-symptomatic, MH diagnostic group, GAD group and MDD group all scoring significantly higher than their respective comparison groups, on both measures and on almost all EMS subscales. These outcomes support previous literature (Bishop et al., 2022; Tariq, Reid et al., 2021; Tariq, Quayle et al., 2021). The 'entitlement/grandiosity' EMS subscale was the only subscale that did not discriminate between the GAD and non-GAD subgroups on both measures. Additionally, 'entitlement/grandiosity' was not significantly different for participants with a MH diagnoses versus no diagnosis, nor those with an MDD diagnosis compared to those without on the YSQ-Brief. However, regression analyses indicated 'entitlement/grandiosity' (as well as all other EMS) predicted depression, anxiety and stress in our sample for both the YSQ-S3 and YSQ-Brief. As such, this does not necessarily indicate that 'entitlement/grandiosity' EMS is not relevant for those with related symptom profiles (i.e., depression, anxiety, stress). It is possible that those who have high levels of entitlement may experience distress more specifically related to that schema (e.g., frustration when their needs are not met).

This study also presents several novel findings in terms of the relationship between EMS and ED symptomatology. On both the YSQ-S3 and the YSQ-Brief, all 18 EMS predicted restraint, eating concerns, weight concerns, and shape concerns. To the best of our knowledge, no studies have previously reported on or established these relationships, except the relationship between 'unrelenting standards' and restraint (Maher et al., 2022). All EMS also predicted higher compensatory behaviours on both measures, apart from 'approval seeking' on the YSQ-Brief. Previously, only relationships between compensatory behaviours and 'defectiveness/shame', 'social isolation/alienation', 'emotional deprivation',

'abandonment/instability', 'insufficient self-control', and 'emotional inhibition' had been established (Maher et al., 2022). These findings not only make important contributions to ED literature, but preliminarily highlight the utility of the YSQ-Brief in assessment of EMS in schema therapy for those with disordered eating symptomatology. These findings provide evidence for important, research-informed treatment targets, which may be helpful to clinicians utilising schema therapy in treatment of EDs. Theoretically, these outcomes offer new insights into core constructs that may contribute to the development and maintenance of ED symptomatology.

Previous literature had also only established relationships between objective binge eating episodes and 'abandonment/instability', 'mistrust/abuse', 'emotional deprivation', 'insufficient self-control', 'enmeshment', and 'failure to achieve' (Maher et al., 2022). In the current study using the YSQ-S3, all EMS except 'emotional deprivation' and 'emotional inhibition' predicted objective binge eating episodes. In this case, most outcomes were in line with previous empirical findings, except that of 'emotional deprivation', which did not support the previously identified relationship with binge eating. Moreover, using the YSQ-Brief, a further five EMS did not predict objective binge eating episodes; 'defectiveness/shame', 'failure to achieve', 'enmeshment', 'unrelenting standards', and 'punitiveness'. It is possible the variability in these findings can be accounted for by the relatively low baseline level of objective binge eating episodes in the sample as a whole (mode = 0 [47.1%], median = 1). Further, as these are only preliminary findings, it is critical to formally re-examine these empirical relationships in in a sample characterised by higher baseline levels of objective binge eating, such as those with BN or BED diagnoses.

The current study provided several important empirical and practical contributions. Importantly, it presents a preliminary development of a YSQ-Brief, which possesses psychometric properties comparable to that of the original YSQ-S3, including model fit, internal consistency, convergent validity, as well as criterion validity. Further, the YSQ-Brief and its subscales demonstrated the ability to distinguish between several putative diagnostic groups, as well as strong relationships with various symptom profiles (internalising and ED). Therefore, the newly revised YSQ-Brief continues to assess all 18 established EMS with greater efficiency and considerably reduced burden, yet still possesses good psychometric properties and potential for clinical utility due to its ability to discriminate between several diagnostic and symptomatic groups.

However, these novel findings and contributions must be considered in context of the limitations of the present study. Firstly, this study utilised a sample of undergraduate

university students. Although participants were asked to self-report if they had any current clinical psychological or MH diagnoses, it was not the specific aim of the current study to collect data from a clinical sample. It is furthermore uncertain whether participants with a clinical diagnosis were undertaking treatment at the time of data collection. It is critical that future studies continue to collect from clinical and/or treatment seeking samples, so as to provide thorough and intentional clinical validations of the YSQ-Brief. Previously established YSQ variants have been utilised cross-culturally and formally translated to various languages (Bishop et al., 2022; Maher et al., 2022; Tariq, Reid et al., 2021; Tariq, Quayle et al., 2021). Therefore, in addition to collecting clinical data, it is important to continue seeking to collect more age, gender and culturally diverse samples. As the YSQ-Brief items wordings were unchanged and no new items were added, the YSQ-Brief may therefore be easily utilised in languages that already have published translations. Moreover, as this was a preliminary development, some important psychometric features were not formally tested in this study, including test-retest reliability and responsiveness to treatment or intervention (Terwee et al., 2007).

It is important to note that individuals in the ED-symptomatic group also reported more diagnoses of MDD and GAD than those in the non-ED group. It is possible this was a potential confound whilst examining the relationship between YSQ scores in those higher in ED symptomatology compared to those without. Given the high comorbidity between EDs and other psychological conditions (Hambleton et al., 2022; Momen et al., 2022; Tan et al., 2023), it is often challenging to determine the specific contributions of each disorder or symptom profile. Future study in relevant clinical populations could aim to examine the specific contributions of ED symptomatology by examining schema patterns in individuals both with and without comorbid conditions. Furthermore, it could be interesting for future study to conduct multiple regression analyses to examine the unique contributions of EMS dimensions within specific populations using the YSQ-Brief. Finally, given the wide use of the schema mode approach in ED treatment (Joshua et al., 2023; Marney et al., 2024), this study could be extended by examining the relationship between EMS on the YSQ-Brief, schema modes and ED symptomatology. This would support clinicians in providing research-informed targets for intervention. We encourage researchers to consider these additional suggestions for future empirical study.

Overall, we present the preliminary development of the YSQ-Brief, alongside some novel findings regarding the relationships between EMS and ED symptomatology, as well as supporting many of the previously established relationships between EMS and depression

and anxiety. It is hoped that this YSQ variant provides practical advantages clinically and in future research, and future research undertake further psychometric investigation in various populations.

Declarations

Author's Contributions

AH and AB were involved in the conception of the study. AH prepared the material, collected the data, performed the data analysis, and prepared the first draft of the manuscript. Subsequent versions of the manuscript were developed in collaboration with AB and MA. All authors read and approved the final manuscript.

Ethics Approval

This study was approved as part of a larger Higher Degree Research project (Approval number 2022/856) by the University of Sydney Human Research Ethics Committee. All participants were provided with a participant information statement and provided their consent to participate in the study. All participants read a Participant Information Statement allowing them to make an informed choice as to whether they wanted to participate in the research or not. They were informed that they could also cease participation at any stage with no penalty to them. The ethics of the consent procedure was approved as above. Participants consented to their data being used for research purposes and consented to unidentifiable aggregate data to be published.

Availability of data and materials

The data using during the current study is available from the corresponding author on reasonable request.

Competing Interests

There are no relevant financial or non-financial competing interests to report or benefits that have arisen from this research.

Funding

The study was supported by funding from the University of Technology Sydney Faculty of Health. AB obtained and managed the funding.

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Young Schema Questionnaire Brief (YSQ-Brief)

Created by Jeffrey Young, & Gary Brown.
Revised by Amaani H. Hatoum, Maree J. Abbott, & Amy L. Burton.

Name: _____

Date: _____

Instructions: Listed below are statements that people might use to describe themselves. Please read each statement, then rate it based on how accurately it fits you **over the past year**. When you are not sure, base your answer on what you **emotionally feel**, not on what you think to be true.

A few of the items ask about your relationships with your parents or romantic partners. If any of these people have died, please answer these items based on your relationships when they were alive. If you do not currently have a partner but have had partners in the past, please answer the item based on your most recent significant romantic partner.

Choose the **highest score from 1 to 6** on the rating scale below that best describes you, then write your answer on the line before each statement.

1 = Completely untrue of me
2 = Mostly untrue of me
3 = Slightly more true than untrue
4 = Moderately true of me
5 = Mostly true of me
6 = Describes me perfectly

1. _____ I find myself clinging to people I'm close to because I'm afraid they'll leave me.

2. _____ I feel that people will take advantage of me.

3. _____ I don't fit in.

4. _____ Almost nothing I do at work (or school) is as good as other people can do.

5. _____ I do not feel capable of getting by on my own in everyday life.

6. _____ I can't seem to escape the feeling that something bad is about to happen.

7. _____ I have not been able to separate myself from my parent(s) the way other people my age seem to.

8. _____ I think that if I do what I want, I'm only asking for trouble.

9. _____ I'm the one who usually ends up taking care of the people I'm close to.

10. _____ I am too self-conscious to show positive feelings to others (e.g., affection, showing I care).

11. _____ I can't seem to discipline myself to complete most routine or boring tasks.

12. _____ Even when things seem to be going well, I feel that it is only temporary.

13. _____ If I make a mistake, I deserve to be punished

14. _____ I need other people so much that I worry about losing them.

15. _____ I feel that I cannot let my guard down in the presence of other people, or else they will intentionally hurt me.

16. _____ No one I desire would want to stay close to me if he or she knew the real me.

17. _____ I feel that a disaster (natural, criminal, financial, or medical) could strike at any moment.

18. _____ My parent(s) and I tend to be over-involved in each other's lives and problems.

19. _____ I feel as if I have no choice but to give in to other people's wishes, or else they will retaliate, get angry, or reject me in some way.

20. _____ I find it embarrassing to express my feelings to others.

21. _____ I try to do my best; I can't settle for "good enough."

22. _____ I'm special and shouldn't have to accept many of the restrictions or limitations placed on other people.

23. _____ Accomplishments are most valuable to me if other people notice them.

24. _____ If something good happens, I worry that something bad is likely to follow.

25. _____ I haven't felt that I am special to someone.

26. _____ I worry that people I feel close to will leave me or abandon me.

27. _____ Most other people are more capable than I am in areas of work and achievement.

28. _____ I worry about being physically attacked by people.

29. _____ It is very difficult for my parent(s) and me to keep intimate details from each other without feeling betrayed or guilty.

30. _____ I must meet all my responsibilities.

31. _____ I have a very difficult time sacrificing immediate gratification or pleasure to achieve a long-range goal.

32. _____ Unless I get a lot of attention from others, I feel less important.

33. _____ If I don't do the job right, I should suffer the consequences.

34. _____ I have not had someone who really listens to me, understands me, or is tuned into my true needs and feelings.

35. _____ I feel alienated or cut off from other people.

36. _____ I feel that I'm not lovable.

37. _____ I'm not as talented as most people are at their work.

38. _____ My judgment cannot be counted on in everyday situations.

39. _____ I've always been the one who listens to everyone else's problems.

40. _____ I feel that there is constant pressure for me to achieve and get things done.

41. _____ I feel that I shouldn't have to follow the normal rules or conventions that other people do.

42. _____ It doesn't matter why I make a mistake. When I do something wrong, I should pay the consequences.

43. _____ I haven't had a strong or wise person to give me sound advice or direction when I'm not sure what to do.

44. _____ I'm usually on the lookout for people's ulterior or hidden motives.

45. _____ I always feel on the outside of groups.

46. _____ I am too unacceptable in very basic ways to reveal myself to other people or to let them get to know me well.

47. _____ I don't feel confident about my ability to solve everyday problems that come up.

48. _____ I have a lot of trouble demanding that my rights be respected and that my feelings be taken into account.

49. _____ Other people see me as doing too much for others and not enough for myself.

50. _____ People see me as uptight emotionally.

51. _____ I feel that what I have to offer is of greater value than the contributions of others.

52. _____ I have rarely been able to stick to my resolutions.

53. _____ Lots of praise and compliments make me feel like a worthwhile person.

54. _____ I worry that a wrong decision could lead to disaster.

Scoring

Emotional Deprivation: Items 25, 34, 43

Abandonment/Instability: Items 1, 14, 26

Mistrust/Abuse: Items 2, 15, 44

Social Isolation/Alienation: Items 3, 35, 45

Defectiveness/Shame: Items 16, 36, 46

Failure to Achieve: Items 4, 27, 37

Dependence/Incompetence: Items 5, 38, 47

Vulnerability to Harm: Items 6, 17, 28

Enmeshment: Items 7, 18, 29

Entitlement/Grandiosity: Items 22, 41, 51

Subjugation: Items 8, 19, 48

Self-sacrifice: Items 9, 39, 49

Emotional Inhibition: Items 10, 20, 50

Unrelenting Standards: Items 21, 30, 40

Insufficient Self-control: Items 11, 31, 52

Approval Seeking: Items 23, 32, 53

Negativity/Pessimism: Items 12, 24, 54

Punitiveness: Items 13, 33, 42