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RESEARCH ARTICLE

Insecure attachment and maladaptive schema in disordered eating: The mediating role of rejection sensitivity

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Aim: The current study aimed to assess insecure attachment and the *disconnection and rejection* domain of maladaptive schema in the context of disordered eating. Rejection sensitivity (RS) was proposed as a mediator between maladaptive schema and disordered eating.

Method: The sample consisted of 108 female participants with a lifetime eating disorder diagnosis and 508 female control participants. Participants were asked to complete a number of self-report measures related to insecure attachment (anxious and avoidant), maladaptive schema (emotional deprivation, abandonment, mistrust, social isolation, and defectiveness), RS (interpersonal and appearance-based), and disordered eating.

Results: Path analysis indicated that anxious attachment was associated with disordered eating through multiple pathways involving emotional deprivation, abandonment, interpersonal RS, and appearance-based RS. Avoidant attachment was not related to disordered eating behaviours.

Conclusion: The results indicate that both interpersonal and appearance-based RS are important mediators for the relationships between insecure attachment, maladaptive schema, and disordered eating.

Key Practitioner Message:

- The results from the current study suggest that insecure attachment leads to maladaptive schema, which in turn leads to sensitivity to rejection and subsequent disordered eating behaviour.
- Attachment anxiety, but not attachment avoidance, was related to greater endorsement of all five schemas in the disconnection and rejection domain.
- Path analysis revealed that, of the schema in the disconnection and rejection domain, only emotional deprivation and abandonment were related to disordered eating.
- Interpersonal and appearance-based rejection sensitivity were significant mediators of the relationship between emotional deprivation and disordered eating as well as the relationship between abandonment and disordered eating.
- Differentiating between schemas within schema domains has clinical value in further understanding the pathway to disordered eating.
- The schemas of emotional deprivation and abandonment are implicated in disordered eating, suggesting the need to target these schemas in schema therapy.

KEYWORDS
appearance, disordered eating, eating disorder, path analysis, rejection sensitivity, schema

1 | INTRODUCTION

Research evidence suggests a relationship between early maladaptive schemas and eating disorder (ED) pathology. Past studies have found that clinical ED patients endorse significantly more maladaptive schemas than do healthy controls (Dingemans, Spinhoven, & van Furth, 2006; Leung, Waller, & Thomas, 1999), with distinction in schema profiles also found between the ED subtypes of anorexia nervosa-restricting (AN-R), anorexia nervosa-binge/purge (AN-BP), and bulimia nervosa (BN) (Unoka, Tölgyes, & Czobor, 2007). However, despite this

documented relationship, the mechanisms behind this association remain unclear. Rejection sensitivity (RS) is involved in the misattribution of rejection (Downey & Feldman, 1996) and may therefore activate existing maladaptive schema, leading to the engagement in disordered eating behaviour. The current study therefore examined for the first time RS as a mediator of the relationship between maladaptive schema and disordered eating.

2 | ATTACHMENT AND EARLY MALADAPTIVE SCHEMA IN EDS

Bowlby's (1973) conceptualisation of attachment theory suggests that early interactions with caregivers influence the way an individual views themselves and the world around them. These early experiences gradually shape attachment and eventually result in a fairly stable attachment style, which can be conceptualized as either *secure* or *insecure* (Bowlby, 1973; Fraley & Shaver, 2000; Main, Kaplan, & Cassidy, 1985). Interactions with abusive or neglectful caregivers are thought to lead to an insecure attachment style, and interactions with warm and responsive caregivers lead to a secure attachment style (Ainsworth, 1979). Based on these early experiences, the child develops internal working models, comprising of core schemas, autobiographical memories, goals, motives, and behavioural strategies (Main et al., 1985). Attachment difficulties are considered a key feature of the presentation of EDs (Ward, Ramsay, & Treasure, 2000; Zachrisson & Skårderud, 2010), and individuals with EDs consistently report more insecure attachments relative to healthy controls (Caglar-Nazali et al., 2014).

Attachment theory has largely informed schema theory; however, attachment differs from early maladaptive schema, in that schema are thought to be a specific facet of internal working models of attachment (Simard, Moss, & Pascuzzo, 2011). Research into core schemas has predominantly drawn on Young's model (Young, 1999; Young, Klosko, & Weishaar, 2003), which defines early maladaptive schemas as stable, enduring, and unconditional themes regarding oneself, others, and the world. Young et al. (2003) suggest that there are five schema domains that correspond to unmet emotional needs in childhood: (a) disconnection and rejection, (b) impaired autonomy and performance, (c) impaired limits, (d) other-directedness, and (e) overvigilance and inhibition. The research evidence pertaining to maladaptive schema suggests a relationship between maladaptive schemas and ED pathology (Jones, Leung, & Harris, 2007). Past studies have found that ED patients endorse significantly more maladaptive schemas than do healthy controls (Dingemans et al., 2006; Leung et al., 1999), with some distinction between specific disordered eating behaviours such as binging, purging, or restrictive symptomatology (for a review, see Jones et al., 2007). Taken together, ED patients report greater attachment difficulties and maladaptive schema than healthy controls; however, the psychological processes underlying these observations remain unknown.

Attachment bonds are thought to influence the expression of maladaptive schema, and evidence has correspondingly shown that insecure attachment is related to greater endorsement of maladaptive schema in community samples (Simard et al., 2011) and mental health service users (Mason, Platts, & Tyson, 2005). The disconnection/rejection domain in particular is associated with insecure attachment and the inability to form secure attachments to others (Bosmans, Braet, & Van Vlierberghe, 2010; Roelofs, Lee, Ruijten, & Lobbestael, 2011; Roelofs, Onckels, & Muris, 2013; Young et al., 2003). Despite this association between attachment and schema, this area has received limited attention in the ED literature, and to date, there is no known study that has assessed these constructs concurrently.

3 | RS AND EARLY MALADAPTIVE SCHEMA

RS is one potential mechanism through which schema may be related to disordered eating. RS is an individual difference in the tendency to anxiously expect, readily perceive, and overreact to real or imagined rejection (Downey & Feldman, 1996). In line with attachment theory, maladaptive schemas and RS are thought to develop from socially learned threats and can be seen as a protective way of responding to an abusive or neglectful environment as a child (Downey, Mougios, Ayduk, London, & Shoda, 2004). This learned expectation of rejection leads an individual to selectively attend to hostile social cues, and the individual is more likely to interpret ambiguous social cues as rejection (Bowlby, 1988). RS has, for instance, been found to be related to bulimic behaviours through emotion dysregulation in a community sample (Selby, Ward, & Joiner, 2010). Research has also shown that individuals with a lifetime diagnosis of EDs show an attentional bias to rejecting faces and a difficulty disengaging attention from these stimuli (Cardi, Di Matteo, Corfield, & Treasure, 2013). RS may activate maladaptive schema and subsequently disordered eating, when an individual is faced with rejection in an interpersonal situation. Schemas such as *abandonment*, *mistrust/abuse*, *emotional deprivation*, and *defectiveness*, for example, may be related to RS as they may influence how an individual thinks and acts in interpersonal relationships. However, this hypothesis is yet to be tested.

Another form of RS specifically tied to one's appearance, and thus potentially related to disordered eating, is appearance-based RS (appearance-RS). Appearance-RS is characterized by anxious concerns and expectations about being rejected based on one's physical appearance (Park, 2007). Appearance-RS has received little attention within the literature, and to date, there are no known studies that have investigated appearance-RS in a clinical ED sample. Appearance-RS may be uniquely related to disordered eating, as individuals with eating pathology may be specifically concerned with rejection based on their appearance. Correspondingly, appearance-RS has been found to predict disordered eating in community samples (Park, 2007), greater risk of body dysmorphic disorder, interest in cosmetic surgery (Park, Calogero, Harwin, & DiRaddo, 2009), and the tendency to make social comparisons based on appearance (Calogero, Park, Rahemtulla, & Williams, 2010).

4 | LIMITATIONS AND GAPS IN THE LITERATURE

There are a number of gaps in the existing literature that need to be addressed in future studies. First, despite the theoretical connections

between attachment theory and schema theory, and the observed relationship in community samples (Simard et al., 2011), there is no known study within the clinical ED literature that has assessed these constructs concurrently. Furthermore, there are a number of studies (for a review see Caglar-Nazali et al., 2014) that have used the Parental Bonding Instrument (Parker, Tupling, & Brown, 1979) as a measure of attachment, which arguably, may not accurately reflect attachment and, further, may not be appropriate for use in clinical samples (Manassis, Owens, Adam, West, & Sheldon-Keller, 1999; Ward et al., 2000). Second, RS remains a relatively understudied literature with the Cardi et al. (2013) paper being the only study to date that has examined RS in a clinical ED population. There are no known studies that have assessed appearance-RS in a clinical ED population. Finally, there are no known studies that have investigated how RS may be related to maladaptive schemas, nor are there are any studies that have assessed maladaptive schema and RS concurrently within the ED literature.

5 | THE CURRENT STUDY

The current study endeavoured to address gaps within the literature by providing the first known investigation into the associations between RS and maladaptive schemas pertaining to rejection, specifically the schema domain *disconnection and rejection*. The study also assessed the role of RS as mediator in the relationship between schema and the outcome measure of disordered eating (see Figure 1). The study utilized a clinical ED sample and a control sample to test the proposed model in Figure 1. An attachment framework was used to provide a conceptual basis for the model.

The current study had four aims: (a) to examine the differences in attachment, maladaptive schema, interpersonal RS, appearance-RS, and disordered eating behaviour between clinical ED participants and control participants; (b) to investigate the role of RS in maladaptive schema; (c) to test the proposed path model in Figure 1; and (d) to assess both interpersonal RS and appearance-RS as mediators in the relationship between schema and disordered eating.

It was hypothesized that (a) clinical ED participants would score higher than controls on all the variables of interest, (b) RS and appearance-RS would be related to the schema domain *disconnection and rejection* (emotional deprivation, abandonment, mistrust/abuse, social isolation, and defectiveness/shame), (c) insecure attachment would be related to maladaptive schema, which in turn would be related to disordered eating through RS and appearance-RS, and (d) both interpersonal RS and appearance-RS would be significant mediators in the relationship between maladaptive schema and disordered eating.

6 | METHOD

6.1 | Participants

The sample consisted of 108 female participants with a lifetime ED diagnosis (50 AN-R, 15 AN-BP, 17 BN, 19 Other Specified Feeding and Eating Disorder, and 7 binge eating disorder), who were recruited from two ED units in Melbourne, and other ED associations across Australia. Formal ED diagnosis was determined from psychiatrist report in tertiary settings according to the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association, 2013), and by self-report in other settings. For the clinical

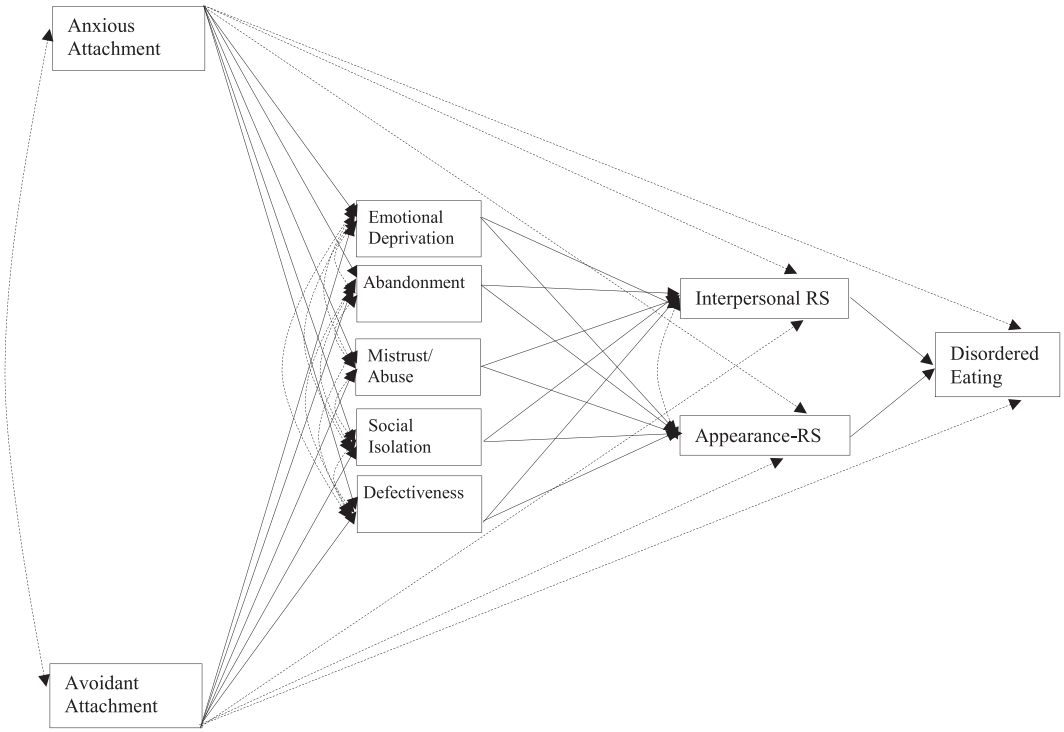

FIGURE 1 Proposed pathway model with rejection sensitivity (RS) and appearance-RS mediating the relationship between maladaptive schema and disordered eating. Solid lines represent the tested path model. Dashed lines represent alternative paths to the outcome variables

ED group, average age of onset for the eating disturbance was 15.12 years (*SD* = 4.64), and of the lifetime ED participants, 36 (33.33%) indicated that they were currently recovered from their ED. A comparison group of 508 female control participants were recruited from a university in Melbourne and the community. Ethical approval was obtained from human research ethics committees from the university and the two Melbourne clinics. The mean age for the total sample was 22.18 years, and most participants were single, Caucasian, and/or a current student.

6.2 | Measures

6.2.1 | Sociodemographics

Information on participant age, height, weight, ethnicity, employment status, marital status, highest completed education, lifetime ED status, and age of ED onset were obtained. Body mass index was subsequently calculated as the ratio of weight (kg) to height squared (m^2).

6.2.2 | Disordered eating

Disordered eating was assessed using the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994). The EDE-Q is a 41-item, self-report measure that assesses attitudes, feelings, and behaviours related to eating and body image over the past 28 days. It yields four subscale scores: *restraint*, *shape concern*, *weight concern*, and *eating concern* and a total score derived as a sum of the subscales. The total score was used in the current study. Cronbach's α for the total score in the current study was .96.

6.2.3 | Attachment style

Attachment style was measured using the Revised Experiences in Close Relationships scale (ECR-R; Fraley, Waller, & Brennan, 2000). The ECR-R is a 36-item self-report measure that assesses individual differences in *attachment anxiety* and *attachment avoidance*. The items are scored on a 7-point rating scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach's α for the current study was attachment anxiety .93 and attachment avoidance .94.

6.2.4 | Schema

Early maladaptive schemas were assessed using the Young Schema Questionnaire Short Form (YSQ-SF-2; Young, 1994). The YSQ-SF is a 75-item self-report measure that is used to assess the presence of 15 maladaptive schemas. The disconnection and rejection schema domain includes *emotional deprivation* (the belief that one has been deprived of emotional connection with others), *abandonment* (the belief that significant people in their life will leave them), *mistrust/abuse* (the expectation that people will use them for their own advantage), *social isolation* (the belief that one is different from everyone else), and *defectiveness/shame* (the belief that one is unlovable due to their defects). The items are scored on a 6-point rating from 1 (*completely untrue of me*) to 6 (*describes me perfectly*). Cronbach's α for the current study was emotional deprivation .90, abandonment .92, mistrust/abuse .89, social isolation .94, and defectiveness/shame .96.

6.2.5 | RS

RS was measured using the Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996). The RSQ is an 18-item self-report measure that presents brief scenarios to assess RS along two dimensions: *rejection concern* (extent to which an individual would be concerned or anxious about a significant other's response to a request) and *acceptance expectancy* (extent to which an individual would expect a significant other to honour their request). For each situation, respondents are asked to indicate rejection concern 1 (*very unconcerned*) to 6 (*very concerned*) and their acceptance expectancy 1 (*very unlikely*) to 6 (*very likely*). In accordance with the test authors' adoption of an expectancy-value model, RS was calculated by weighting the expected likelihood of rejection by the degree of concern over its occurrence. Specifically, expectancy of acceptance was reversed scored to index *expectancy of rejection* (expectancy of rejection = 7 −expectancy of acceptance). Total RS score was then calculated as the product of rejection concern and expectancy of rejection. Cronbach's α for the current study was .85.

6.2.6 | Appearance-RS

Appearance-RS was measured using the Appearance-RS Scale (Park, 2007). The Appearance-RS Scale is an 18-item self-report measure that presents brief scenarios to assess RS based on appearance along two dimensions: *rejection concern* (how concerned an individual would be about rejection based on appearance) and *rejection expectancy* (extent to which an individual would expect rejection based on appearance). For each situation, respondents are asked to indicate rejection concern 1 (*very unconcerned*) to 6 (*very concerned*) and rejection expectancy 1 (*very unlikely*) to 6 (*very likely*). Total appearance-RS score was calculated by multiplying the degree of rejection concern with the degree of rejection expectancy. Cronbach's α for the current study was .96.

6.3 | Procedure

Consenting adults were given access to an online questionnaire via Qualtrics Online Survey Software. Participants read a consent form informing them of the voluntary nature of the study, before proceeding with the questionnaire. The participants were then asked to complete a number of sociodemographic questions and the above outlined self-report measures as part of a 1.5-hr long battery. Participants were informed that they could withdraw from the study at any time.

6.4 | Statistical analyses

All descriptive, correlational, and group-difference based analyses were conducted using IBM SPSS 24.0, whereas path analyses were undertaken using MPlus software. Between-group analyses of the sociodemographic factors were conducted using *t* tests to identify differences between the clinical ED sample and the control sample. Two-tailed bivariate correlations were conducted separately for the clinical ED group and the control group. Correlations were derived between attachment, maladaptive schema, RS, appearance-RS, and disordered eating.

Path analysis using MPlus software was undertaken to test the hypothesized model in Figure 1. Structural invariance testing was conducted to investigate whether the relationships in the models were equivalent across the ED group and the control group. All models were controlled for age given established group differences. Bootstrapping (5,000 bootstraps) was used to assess mediation (Shrout & Bolger, 2002). Model modification was completed where improvements to the fit of the data could be obtained and if theoretically justifiable. Given that the χ^2 statistic is highly sensitive to large sample sizes (Tabachnick & Fidell, 2007), model fit assessments using this statistic were supplemented with other commonly used fit statistics: the comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root-mean square residual (SRMR). Following recommended criteria, CFI values above .95, RMSEA below .10, and SRMR below .08 were used to indicate acceptable model fit (Schermelleh-Engel, Moosbrugger, & Muller, 2003). The model was first tested for the ED group and the control group separately where all parameters were allowed to vary across groups (unconstrained model). Next, the model was constrained, whereby regression paths for each group were constrained to be equal and compared with the unconstrained model. A model was deemed structurally invariant (i.e., equivalent across groups), if ΔCFI is less than .01 (Cheung & Rensvold, 2002).

7 | RESULTS

7.1 | Sociodemographics

The sociodemographic variables for the overall sample, clinical ED sample, and the control sample are presented in Table 1. Significant group differences were observed for age, ethnicity, and marital and employment status, with the clinical ED group being significantly older, comprising more Caucasians and being more commonly married and unemployed than the controls. Conversely, the control sample entailed more Asian, single, and student participants than the ED sample. There were no significant differences between the groups on highest level of attained education or current body mass index.

TABLE 1 Sociodemographic details of study participants

	Total (*n* = 616)	ED (*n* = 108)	Controls (*n* = 508)	*p*	χ^2	Cramer's V
Mean (*SD*)						
Age (years)	22.18 (7.77)	25.45 (7.65)	21.49 (7.63)	<.001		
BMI	21.74 (4.23)	21.07 (4.58)	21.87 (4.16)	.087		
N (%)						
Ethnicity				<.001	84.710	.371
Caucasian	274 (44.5)	87 (80.56)	187 (36.81)			
Aboriginal/Torres Strait	1 (.20)	0	1 (.20)			
Asian	226 (36.70)	4 (3.70)	222 (43.70)			
European	66 (10.70)	10 (9.26)	56 (11.02)			
Middle-Eastern	7 (1.10)	0	7 (1.38)			
African	4 (.60)	0	4 (.79)			
Hispanic	2 (.25)	1 (.93)	0			
Other	37 (6.00)	6 (5.56)	31 (6.10)			
Highest completed education				.149	5.330	.093
Primary	2 (.30)	1 (.93)	1 (.20)			
Secondary	307 (49.80)	57 (52.78)	250 (49.21)			
Tertiary	250 (40.60)	36 (33.33)	214 (42.13)			
Postgraduate	57 (9.3)	14 (12.96)	43 (8.46)			
Marital status				<.001	34.420	.236
Single	408 (66.20)	61 (56.48)	347 (68.31)			
In a relationship	163 (26.50)	27 (25.00)	137 (26.97)			
Married	36 (5.80)	16 (14.81)	20 (3.94)			
Separated	5 (.80)	4 (3.70)	1 (.20)			
Divorced	3 (.50)	1 (.93)	2 (.39)			
Widowed	1 (.20)	0	1 (.20)			
Employment				<.001	52.046	.291
Working full time	58 (9.40)	19 (17.59)	39 (7.68)			
Working part time	146 (23.70)	27 (25.00)	119 (23.43)			
Unemployed	38 (6.20)	20 (18.52)	18 (3.54)			
Student	374 (60.7)	42 (38.89)	332 (65.35)			

Note. Group difference comparisons between clinical eating disorder (ED) group and control group based on *t* tests for continuous variables and chi-square tests for categorical variables.

7.2 | Differences in the variables of interest between the clinical ED group and the control group

Table 2 outlines the mean values and results from the group difference tests between the ED and the control groups for the attachment, schema, RS, and disordered eating variables. Across all the variables, the clinical ED participants reported significantly higher scores than the controls.

7.3 | Correlational analyses for the variables of interest

Pearson's correlations for all variables of interest are presented in Table 3. For the clinical ED group, both attachment anxiety and attachment avoidance showed medium to large significant positive associations with maladaptive schema endorsement, interpersonal RS, appearance-RS, and disordered eating variables. For the control group, correlations were comparable, except for attachment avoidance, which had weaker correlations with all variables. In regards to the relationships between maladaptive schema and RS, RS (both interpersonal and appearance based) showed moderate to large significant positive associations with all five schemas in the disconnection and rejection domain for both clinical ED and control groups.

7.4 | Path analysis

7.4.1 | Invariance testing

Invariance testing conducted between the clinical ED and the control groups indicated that the model was structurally invariant (i.e., similar between groups), with the significance and direction of effects equivalent across groups. The fit for the constrained model was χ^2 = 117.262, RMSEA = 0.054, SRMR = 0.054, and CFI = 0.988, and the fit for the unconstrained model was χ^2 = 38.616, RMSEA = 0.076, SRMR = 0.034, and CFI = 0.994. ΔCFI < .01 indicating structural invariance, and that a single model was suitable for the whole sample. The sample was then combined and the proposed model was run again.

7.4.2 | Whole sample approach

Path analysis indicated that the overall model demonstrated good fit (χ^2 = 29.068, RMSEA = 0.072, SRMR = 0.021, and CFI = 0.995). The final model accounted for 90.9% of the variance for disordered eating (R^2 = 0.909). In terms of the direct effects, attachment anxiety, abandonment, interpersonal RS, and appearance-RS were directly associated with disordered eating (see Table 4). The direct effects of the tested model appear in Figure 2.

Indirect effects are presented in Table 5. Mediation analyses indicated significant pathways from the following: (a) attachment anxiety → abandonment → disordered eating, (b) attachment anxiety → abandonment → appearance-RS → disordered eating, (c) attachment anxiety → abandonment → RS → disordered eating, (d) attachment anxiety → emotional deprivation → RS → disordered eating, and (e) attachment anxiety → emotional deprivation → appearance-RS → disordered eating.

7.4.3 | Mediational analyses between schema and disordered eating

The results for the mediational analyses between schema and disordered eating through interpersonal RS and appearance-RS are shown in Table 6. Interpersonal RS and appearance-RS mediated the relationship between emotional deprivation and disordered eating. The path from abandonment to disordered eating was partially mediated by interpersonal RS and appearance-RS. There were no significant indirect effects found for mistrust/abuse, social isolation, or defectiveness to disordered eating.

8 | DISCUSSION

The current study is the first of its kind to investigate the interrelationships between attachment, RS, appearance-RS, and maladaptive schema in the context of disordered eating. Specifically, the study aimed to examine the differences between the clinical ED participants and control participants on the variables of interest, and to test a new model of disordered eating in which insecure attachment leads to maladaptive schema, which in turn leads to interpersonal and appearance-RS and subsequent disordered eating behaviours. The results offer partial support for our initial hypotheses, indicating that (a) clinical ED participants experienced greater difficulties with attachment, maladaptive schema, sensitivity to rejection, and disordered eating behaviours relative to controls; (b) interpersonal RS and appearance-RS were related to the

TABLE 2 Descriptive statistics and group difference tests.

Mean (*SD*)	ED (*n* = 108)	Controls (*n* = 508)	t	*p*	d
Attachment anxiety	3.96 (1.18)	3.53 (1.22)	3.379	.001	.36
Attachment avoidance	3.99 (1.30)	3.19 (2.80)	2.900	.004	.37
YSQ emotional deprivation	13.79 (7.43)	12.05 (6.36)	2.261	.025	.25
YSQ abandonment	15.69 (7.80)	12.88 (6.47)	3.495	.001	.39
YSQ mistrust/abuse	14.75 (7.25)	12.81 (5.88)	2.612	.010	.29
YSQ social isolation	19.25 (7.52)	12.87 (6.51)	8.188	<.001	.90
YSQ defectiveness	17.53 (8.63)	10.49 (6.28)	8.028	<.001	.93
RS	13.45 (6.22)	9.87 (3.78)	5.765	<.001	.70
Appearance-RS	20.283 (9.45)	14.39 (7.41)	6.094	<.001	.70
Disordered eating	3.47 (1.61)	1.75 (1.30)	10.357	<.001	1.18

Note. ED = eating disorder; RS = rejection sensitivity; YSQ = Young Schema Questionnaire.

TABLE 3 Bivariate correlations between insecure attachment, RS, appearance-RS, social rank, and disordered eating variables

	AttAnx	AttAvoid	YSQEmo	YSQAba	YSQMis	YSQSoc	YSQDef	RS	ARS	EDE
AttAnx	1	.565**	.406**	.602**	.577**	.444**	.543**	.579**	.484**	.404**
AttAvoid	.194**	1	.460**	.371**	.447**	.462**	.601**	.374**	.293**	.404**
YSQEmo	.392**	.189**	1	.523**	.510**	.496**	.469**	.424**	.245*	.337**
YSQAba	.497**	.131**	.519**	1	.682**	.576**	.579**	.668**	.564**	.462**
YSQMis	.431**	.191**	.579**	.592**	1	.582**	.552**	.558**	.575**	.461**
YSQSoc	.445**	.185**	.667**	.601**	.643**	1	.693**	.562**	.436**	.539**
YSQDef	.479**	.200**	.621**	.588**	.668**	.731**	1	.676**	.588**	.632**
RS	.461**	.102*	.408**	.435**	.434**	.436**	.481**	1	.737**	.573**
ARS	.470**	.104*	.294**	.397**	.381**	.427**	.465**	.501**	1	.632**
EDE	.342**	.148**	.298**	.279**	.342**	.350**	.375**	.400**	.551**	1

Note. Correlations for the eating disorder (ED) sample appear above the diagonal, and correlations for the control sample appear below the diagonal. AttAnx = Attachment Anxiety; AttAvoid = Attachment Avoidance; RS = Interpersonal RS; ARS = Appearance-RS; YSQEmo = Emotional Deprivation; YSQAba = Abandonment; YSQMis = Mistrust/Abuse; YSQSoc = Social Isolation; YSQDef = Defectiveness; EDE = EDE-Q total disordered eating.

**Correlation is significant at the 0.01 level (2-tailed).

maladaptive schema domain of *disconnection and rejection*, but only the schemas of emotional deprivation and abandonment; (c) anxious attachment was associated with disordered eating through multiple pathways involving emotional deprivation, abandonment, interpersonal RS, and appearance-RS, avoidant attachment however was not related to disordered eating behaviour; and (d) interpersonal RS and appearance-RS were significant mediators for the relationships between maladaptive schema and disordered eating.

8.1 | Differences between the clinical ED group and controls on the variables of interest

Consistent with the hypotheses, group difference tests indicated that the clinical ED group scored higher than the controls on all the variables of interest. In line with previous research (Caglar-Nazali et al., 2014), the clinical ED group reported greater attachment anxiety and avoidance than the control sample. The results also supported existing findings regarding maladaptive schema (Dingemans et al., 2006; Leung et al., 1999; Waller, Ohanian, Meyer, & Osman, 2000), with the clinical ED participants scoring higher than controls on all five maladaptive schema. The current study also represents the first investigation of self-reported RS (both interpersonal and appearance-based) in a clinical ED group. The results indicate that clinical ED participants reported higher levels of RS and appearance-RS than controls, thus offering support for Cardi et al.'s (2013) behavioural study, which found that lifetime ED participants displayed an attentional bias to rejection compared to controls.

8.2 | Sensitivity to rejection and the schema domain of disconnection and rejection

The current study represents the first known investigation of the relationships between maladaptive schemas and sensitivity to rejection. The measures of maladaptive schemas, RS, and appearance-RS were positively correlated, supporting the hypotheses and the theoretical framework for the model. According to schema theory (Young et al., 2003), individuals with schema in the disconnection and rejection domain are often unable to form secure attachments to others as they believe that their needs for love, stability, safety, belonging, and nurturance will not be met. Similar to attachment theory (Bowlby, 1973), Young et al. (2003) assert that for those with disconnection and rejection schema, the early family environment was most likely cold (emotional deprivation), unstable (abandonment), abusive (mistrust/abuse), isolated (social isolation), and/or rejecting (defectiveness/shame). It therefore makes conceptual and empirical sense that in the current study rejection, both interpersonal and appearance-based, was found to be correlated with maladaptive schema in the disconnection and rejection domain.

8.3 | Path analysis of the proposed model

Invariance testing of the proposed model was conducted to determine whether the relationships in the models were equivalent across the clinical ED group and the control group. The current results suggested that the model was structurally invariant (i.e., similar between groups) and that a single model was suitable for the whole sample. The clinical ED sample and the control sample were then combined, and the

TABLE 4 Standardized coefficients from analyses testing direct effect pathways between all variables for the sample as a whole (n = 616)

Direct effect (independent variable → dependent variable)	β	*SE*	*p* value (two-tailed)
Attachment anxiety → emotional deprivation	0.356	0.038	**<.001**
Attachment anxiety → abandonment	0.336	0.039	**<.001**
Attachment anxiety → mistrust/abuse	0.258	0.040	**<.001**
Attachment anxiety → social isolation	0.361	0.038	**<.001**
Attachment anxiety → defectiveness/shame	0.335	0.038	**<.001**
Attachment anxiety → ARS	0.006	0.026	.833
Attachment anxiety → RS	0.005	0.027	.861
Attachment anxiety → EDE	0.036	0.15	**.014**
Attachment avoidance → emotional deprivation	−0.017	0.040	.678
Attachment avoidance → abandonment	−0.018	0.041	.662
Attachment avoidance → mistrust/abuse	0.021	0.042	.618
Attachment avoidance → social isolation	0.038	0.040	.336
Attachment avoidance → defectiveness/shame	0.116	0.040	**.003**
Attachment avoidance → ARS	-0.004	0.024	.877
Attachment avoidance → RS	−0.013	0.025	.597
Attachment avoidance → EDE	0.004	0.013	.759
Emotional deprivation → ARS	0.293	0.027	**<.001**
Emotional deprivation → RS	0.230	0.029	**<.001**
Emotional deprivation → EDE	-0.031	0.017	.069
Abandonment → ARS	0.599	0.025	**<.001**
Abandonment → RS	0.649	0.026	**<.001**
Abandonment → EDE	0.191	0.021	**<.001**
Mistrust/abuse → ARS	0.028	0.028	.315
Mistrust/abuse → RS	0.045	0.029	.123
Mistrust/abuse → EDE	-0.004	0.016	.808
Social isolation → ARS	0.035	0.030	.242
Social isolation → RS	0.015	0.031	.623
Social isolation → EDE	0.003	0.017	.878
Defectiveness/shame → ARS	0.018	0.031	.561
Defectiveness/shame → RS	0.001	0.032	.975
Defectiveness/shame → EDE	0.016	0.017	.370
ARS → EDE	0.606	0.042	**<.001**
RS → EDE	0.196	0.040	**<.001**

Note. Significant pathways appear in bold; β = standardized beta weight, *SE* = standard error; RS = Interpersonal RS; ARS = Appearance-RS; EDE = EDE-Q total disordered eating.

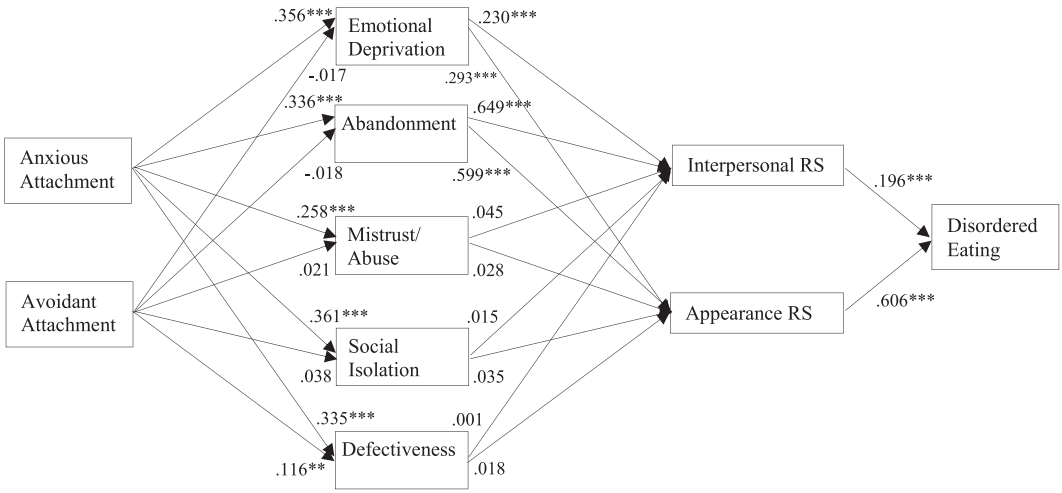

FIGURE 2 All direct effects for the path model. Significant at ***p < .001, **p < .01, *p < .05. RS = rejection sensitivity

TABLE 5 Standardized coefficients from analyses testing direct effect pathways between all variables for the sample as a whole (n = 616)

Direct effect (independent variable → dependent variable)	β	*SE*	*p* value (two-tailed)
AttAnx → ARS → EDE	0.003	0.017	.844
AttAnxx → RS → EDE	0.001	0.006	.870
AttAnx → emotional deprivation → EDE	−0.011	0.006	.079
AttAnx → abandonment → EDE	0.064	0.012	**<.000**
AttAnx → mistrust/abuse → EDE	−0.001	0.005	.830
AttAnx → social isolation → EDE	0.001	0.006	.885
AttAnx → defectiveness/shame → EDE	0.005	0.007	.441
AttAnx → emotional deprivation → ARS → EDE	0.063	0.012	**<.000**
AttAnx → abandonment → ARS → EDE	0.122	0.017	**<.000**
AttAnx → mistrust/abuse → ARS → EDE	0.004	0.005	.404
AttAnx → social isolation → ARS → EDE	0.008	0.007	.285
AttAnx → defectiveness/shame → ARS → EDE	0.004	0.007	.599
AttAnx → emotional deprivation → RS → EDE	0.016	0.005	**.001**
AttAnx → abandonment → RS → EDE	0.043	0.011	**<.000**
AttAnx → mistrust/abuse → RS → EDE	0.002	0.002	.224
AttAnx → social isolation → RS → EDE	0.001	0.002	.656
AttAnx → defectiveness/shame → RS → EDE	0.000	0.002	.977
AttAvoid → ARS → EDE	−0.002	0.017	.895
AttAvoid → RS → EDE	−0.003	0.006	.652
AttAvoid → emotional deprivation → EDE	0.001	0.002	.744
AttAvoid → abandonment → EDE	−0.003	0.008	.682
AttAvoid → mistrust/abuse → EDE	0.000	0.001	.927
AttAvoid → social isolation → EDE	0.000	0.001	.923
AttAvoid → defectiveness/shame → EDE	0.002	0.002	.468
AttAvoid → emotional deprivation → ARS → EDE	−0.003	0.008	.706
AttAvoid → abandonment → ARS → EDE	−0.006	0.0216	.679
AttAvoid → mistrust/abuse → ARS → EDE	0.000	0.001	.775
AttAvoid → social isolation → ARS → EDE	0.001	0.001	.554
AttAvoid → defectiveness/shame → ARS → EDE	0.001	0.003	.625
AttAvoid → emotional deprivation → RS → EDE	−0.001	0.002	.712
AttAvoid → abandonment → RS → EDE	−0.002	0.006	.687
AttAvoid → mistrust/abuse → RS → EDE	0.000	0.001	.721
AttAvoid → social isolation → RS → EDE	0.000	0.000	.778
AttAvoid → defectiveness/shame → RS → EDE	0.000	0.001	.978

Note. Significant pathways appear in bold; β = standardized beta weight, *SE* = standard error; AttAnx = Attachment Anxiety; AttAvoid = Attachment Avoidance; RS = Interpersonal RS; ARS = Appearance-RS; EDE = EDE-Q total disordered eating.

proposed model was run again. The current results offer partial support for the proposed model.

Path analysis revealed that attachment anxiety was associated with all five schemas in the disconnection and rejection domain. Specifically, the model indicated that anxious attachment led to emotional deprivation and abandonment, which in turn led to disordered eating through RS and appearance-RS. These findings are consistent with previous research (Bosmans et al., 2010) that suggests an association between insecure attachment and the disconnection/rejection schema domain. Attachment avoidance, however, was only associated with the defectiveness/shame schema. The association between attachment avoidance and defectiveness/shame may be due to the nature of the defectiveness/shame schema, which is related to the belief that one is unlovable due to their defects. An individual with avoidant attachment may, for example, have grown up in a rejecting household, leading them to accept that they are flawed, and thus lead them to avoid social connection with others and place less importance on the possibility of interpersonal or appearance-based rejection.

Further examination of the path model revealed that, of the schema in the disconnection and rejection domain, only emotional deprivation and abandonment were related to disordered eating. These results are consistent with previous studies (Boone, Braet, Vandereycken, & Claes, 2013; Jones, Harris, & Leung, 2005; Leung et al., 1999; Waller, Dickson, & Ohanian, 2002; Waller, Meyer, & Ohanian, 2001); however, they contrast other studies that have found significant associations between mistrust/abuse (Jones et al., 2005; Waller et al., 2000), social isolation (Gongora, Derksen, & van Der Staak, 2004; Jones et al., 2005; Waller, 2003; Waller et al., 2001; Waller et al., 2002), defectiveness/shame (Jones et al., 2005; Leung et al., 1999; Waller et al., 2000; Waller et al., 2001), and disordered eating. The current findings may be explained by the nature of the schema

TABLE 6 Standardized coefficients from analyses testing indirect effect pathways from maladaptive schema to disordered eating for the sample as a whole (n = 616).

Indirect effect (schema → mediator variable(s) → disordered eating)	β	*SE*	*p* value (two-tailed)
Emotional deprivation → ARS → EDE	0.178	0.024	**<.001**
Emotional deprivation → RS → EDE	0.045	0.012	**<.001**
Abandonment → ARS → EDE	0.364	0.032	**<.001**
Abandonment → RS → EDE	0.127	0.028	**<.001**
Mistrust/abuse → RS → EDE	0.017	0.020	.393
Mistrust/abuse → RS → EDE	0.009	0.007	.199
Social isolation → ARS → EDE	0.021	0.020	.275
Social isolation → RS → EDE	0.003	0.007	.652
Defectiveness/shame → ARS → EDE	0.011	0.021	.596
Defectiveness/shame → RS → EDE	0.000	0.007	.977

Note. Significant pathways appear in bold; β = standardized beta weight, *SE* = standard error; RS = Interpersonal RS; ARS = Appearance-RS; EDE = EDE-Q total disordered eating.

themselves. Emotional deprivation is the belief that one has been deprived of emotional connection with others, and abandonment is the belief that significant people in their life will leave them (Young et al., 2003). These schemas appear to be fundamentally different to the schemas of mistrust/abuse, social isolation, and defectiveness/shame, which appear to have a defeatist perspective compared to emotional deprivation and abandonment, which appear to be future focused. For example, a person with emotional deprivation and abandonment schemas may never have experienced nurturance and warmth from their caregivers, thus the individual is inclined to search for nurturance from others. The individual may gain this acceptance by being sensitive to rejection; however once they have gained acceptance, they inevitably are frightened of potentially losing the connection. Furthermore, unlike the defectiveness/shame schema, these individuals may believe that they are deserving of love and may respond to real or imagined rejection in unhelpful ways such as disordered eating.

8.4 | Interpersonal and appearance-based rejection as mediators of the relationship between maladaptive schema and disordered eating

The current results indicate that interpersonal RS and appearance-RS are significant mediators of the relationship between emotional deprivation and disordered eating as well as the relationship between abandonment and disordered eating. According to Young (1999), schemas may remain latent until they are activated by situations or life events that are relevant to that particular schema. The current findings therefore suggest that for individuals with emotional deprivation schema and/or abandonment schemas, certain interpersonal situations, particularly where the individual faces the possibility of being rejected either interpersonally or by their appearance, may activate these maladaptive schemas and thus lead the individual to engage in disordered eating behaviour to cope with the rejection.

8.5 | Limitations

The results of the current study should be considered in the context of several study limitations. First, previous research has focused on differences between ED subtypes but the current study did not. According to some research (Unoka et al., 2007; Waller et al., 2000), diagnostic subgroups differ on certain maladaptive core beliefs (e.g., Leung et al., 1999; Pauwels, Dierckx, Schoevaerts, & Claes, 2016). The current study was unable to investigate differences across ED subtypes, as the majority of the clinical sample had an AN-R diagnosis. This is due to recruitment from tertiary facilities, and the fact that AN-R patients tend to present more frequently to these facilities due to their low weight and associated medical instability (Hay et al., 2014). The literature pertaining to differences in schema between ED subtypes therefore remains inconclusive and requires further investigation. Second, there are general issues with self-report data such as impression management, which may be an issue for the clinical ED participants who may have been engaged in treatment at the time. Third, the use of the EDE-Q as measure of disordered eating for participants in inpatient settings may not accurately reflect the extent of behaviours (such a restriction) due to the strict monitoring of dietary plans in these tertiary facilities. Finally, as the study was cross-sectional, the present findings do not establish causality. Future research directions should consider the use of longitudinal samples to further examine the mechanisms leading to disordered eating.

8.6 | Implications

The results from the current study suggest that insecure attachment leads to maladaptive schema, which in turn leads to sensitivity to rejection and subsequent disordered eating behaviour. The results highlight the need to disambiguate insecure anxious attachment from insecure avoidant attachment, as the current findings indicate that attachment anxiety, but not attachment avoidance, was related to greater endorsement of all five schemas and subsequent disordered eating behaviour. The current results also indicate that differentiating between schemas within schema domains has clinical value in further understanding the pathway to disordered eating.

The findings for the current interpersonal model highlight the need for further examination of interpersonal difficulties in disordered eating in order to inform treatments targeting interpersonal functioning for this at-risk population. Specifically, the current results indicate that the schemas of emotional deprivation and abandonment are implicated in disordered eating, suggesting the need to target these schemas in schema therapy. Despite the enduring nature of schemas, there is some evidence to suggest that they may be changed through corrective experiences (Cruwys et al., 2014). Cruwys et al. (2014), for example, found that social isolation schema may be corrected through positive social experiences. There are also interventions aimed at correcting cognitive bias towards negative social cues that have shown some promise. Dandeneau and Baldwin (2004), for instance, developed a task to train the response of inhibiting rejection information by repeatedly identifying positive social cues. The study found that after this inhibition training, individuals with chronic low self-esteem experienced significantly less

interference on rejection words during a Stroop task. Cardi et al. (2015) have also applied cognitive bias training to EDs and found that at the end of intervention, there was an increase in attention to positive social cues and fewer negative interpretations of ambiguous social stimuli. Given that schemas are activated by situations or life events that are relevant to that particular schema, future research directions may not only address the prevention of the development of maladaptive schema through parenting programs, but also address the cognitive biases that trigger and maintain EDs.

9 | CONCLUSION

In conclusion, the current study sought to assess the interrelationships between attachment, maladaptive schema, and sensitivity to rejection in the context of disordered eating and tested these constructs within a new interpersonal model of disordered eating. The current findings build upon existing theoretical understandings and empirical research pertaining to interpersonal functioning in disordered eating. The results suggest that insecure attachment, particularly attachment anxiety, is implicated in the development of the maladaptive schemas emotional deprivation and abandonment, which in turn led to disordered eating through interpersonal RS and appearance-RS. Future research directions should consider the utilisation of measures of interpersonal RS and appearance-RS in order to understand cognitive biases that maintain disordered eating behaviour. Future research may also consider the further development of the proposed model to gain further understanding of the pathways to EDs and to inform treatments targeting interpersonal functioning for those presenting with disordered eating.

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