

Adult attachment anxiety is associated with night eating syndrome in UK and US-based samples: two cross-sectional studies

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1 2	Adult attachment anxiety is associated with night eating syndrome
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- 27 Abstract:
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29 Previous research has shown that "attachment anxiety" is a robust predictor of 30 disinhibited eating behaviours and that this relationship is underpinned by difficulties in managing emotion. Night eating syndrome (NES), a proposed eating disorder 31 32 characterized by evening hyperphagia, nocturnal awakenings to eat, and morning 33 anorexia, is also associated with eating to manage emotion. Across two studies (N =276 & N = 486), we considered a relationship between attachment anxiety and NES. 34 35 In Study 1, we hypothesised (pre-registered) that attachment anxiety would predict NES score and that this relationship would be mediated by disinhibited eating. 36 Participants were asked to complete questionnaire measures of attachment 37 38 orientation, disinhibited eating (emotional and uncontrolled eating) and NES. Our 39 parallel mediation model confirmed a direct relationship between attachment anxiety and NES (p < .001) and showed an indirect path via both emotional (95% CI: 0.15 -40 41 0.63) and uncontrolled eating (95% CI: 0.001 - 0.36). In Study 2, we showed that 42 fear of negative evaluation of eating significantly mediated a reversed relationship 43 between attachment anxiety and NES (95% CI: 0.02 - 0.04). Finally, across both studies we used a novel tool to assess "eating to cope". We showed a relationship 44 45 with emotional eating but failed to show a robust relationship with NES. Attachment 46 orientation may represent a potential intervention target for night eating syndrome. Future research should consider a longitudinal approach to strengthen our 47 understanding of directionality amongst these factors. 48

49

50 **Keywords**: Night eating syndrome; Attachment anxiety; disinhibited eating;

51 emotional eating; eating to cope

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53 **1.0 Introduction**

Night eating syndrome (NES) is classified as an "other specified feeding or 54 55 eating disorder" in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and is characterized by episodes of night eating (defined by eating 25% or more 56 57 of daily food consumption after the evening meal), nocturnal awakening to eat 58 accompanied by the belief that eating would enable a return to sleep, and loss of appetite in the morning (Allison et al., 2010; Stunkard et al., 1955). NES prevalence 59 60 is similar for women and men, and has been estimated to occur in 1.5% of the general population with a significantly higher incidence in patients with sleep 61 disorders, binge eating disorder, obesity, and other psychiatric disorders (Vander 62 63 Wal, 2012). NES is inconsistently associated with elevated body mass index (BMI), 64 perhaps due to age and emotional eating acting as moderators of this relationship (Bruzas & Allison, 2019). NES is associated with poorer weight-loss outcomes for 65 66 individuals with obesity attending an outpatient clinic (Gluck et al., 2001).

When first described, it was suggested that the onset of NES was related to 67 stressful experiences (Stunkard et al., 1955). Subsequent work has shown that NES 68 is higher in those who perceive their stress to be higher, have higher trait anxiety and 69 70 elevated cortisol levels, and engaging in a relaxation programme was associated 71 with improvements in these symptoms (Pawlow et al., 2003). Wichianson et al. 72 (2009) investigated the relationship between perceived stress and NES in a group of college students; they found that the use of maladaptive coping strategies mediated 73 74 the relationship between the experience of stress and NES. Moderation analyses showed that the relationship between perceived stress and NES was stronger for 75 76 those who engaged in less adaptive coping strategies (e.g., substance use, self-

distraction, and self-blame) compared to those engaging in more adaptive coping
strategies (e.g., use of emotional support, positive reframing and active coping).

Consistent with the finding that NES may be more problematic in those with 79 80 poor coping strategies, NES is related to other eating psychopathologies, such as 81 emotional eating (eating in the presence of negative emotion) and external eating 82 (eating in the presence of food) (Meule et al., 2014a; Nolan & Geliebter, 2012) and "food addiction" (Nolan & Geliebter, 2016) which is when certain foods cause 83 addiction-like behavioural and neural responses and overeating may represent an 84 85 addicted behaviour (Schulte et al., 2015). Furthermore, emotional eating has been shown to moderate the relationship between NES and both binge eating and BMI 86 (Meule et al., 2014b). 87

88 Indeed, in a qualitative exploration of the development, maintenance and consequences of NES a central concept of "emotional hunger" was developed, 89 which reflected participants describing food as a way to manage overwhelming and 90 91 intense emotions (Shillito et al., 2018). This core concept was supported by subthemes including cultivating a dependency on food, relying on food to regulate 92 93 emotions, understanding the significance of night-time, and acknowledging the consequences of night eating, including on interpersonal relationships. These 94 95 findings further support the view that emotion regulation is a key component in the 96 expression of NES. Given these reports, the overarching aim of the current studies was to investigate NES considering "attachment theory" (Bowlby, 1969), which 97 incorporates a conceptual framework that has been widely used to understand 98 99 emotion regulation in interpersonal functioning (Shaver & Mikulincer, 2007) and the use of food as a way to cope with negative emotion (Maunder & Hunter, 2001). 100

101 Adult attachment orientation reflects the quality of our interpersonal 102 relationships and is influenced by our significant adult relationships as well as the early interactions we had with our caregivers (Bowlby, 1969). It is a key predictor of 103 104 emotion regulation (Mikulincer & Shaver, 2019) and is commonly conceptualised and 105 assessed in terms of two dimensions (Brennan et al., 1998); attachment anxiety is 106 characterised by a fear of abandonment and attachment avoidance is characterised 107 by a fear of intimacy. Broadly, attachment orientation can be viewed as "secure", 108 reflected by low scores on both dimensions of attachment orientation, or "insecure", 109 reflected by high scores on one or both attachment dimensions.

110 Securely attached individuals are better able to effectively cope with their 111 emotions in response to stress by engaging in productive interpersonal contact or in 112 the absence of this, they are able to engage in "self-soothing" (i.e., soothe 113 themselves in a way that emulates how a caregiver would soothe them) (Mikulincer 114 & Florian, 1998). By contrast, insecurely attached individuals tend to be poorer at 115 managing their emotions in response to upsetting or stressful events (Mikulincer, 1998). Attachment avoidance is associated with the avoidance of emotions and 116 117 suppression of stress and help-seeking (Mikulincer & Orbach, 1995). Individuals high in attachment anxiety experience a general hyperactivation of the attachment system 118 119 and are hypervigilant to negative/stressful events (Mikulincer & Florian, 1998). 120 Attachment anxious individuals are more likely to cope via external sources of affect 121 regulation such as food, drugs and alcohol (Maunder & Hunter, 2001).

Indeed, a recent meta-analysis has shown that greater attachment insecurity (both attachment anxiety and avoidance) is associated with unhealthy eating behaviours (Faber et al., 2018). However, it should be noted that the association between attachment avoidance and unhealthy eating had a smaller effect size than

126 other associations reported, and that this relationship has been somewhat more elusive in the research literature (Wilkinson et al., 2019). These unhealthy eating 127 128 behaviours (e.g., disinhibited eating and/or emotional eating) mediate a relationship 129 between attachment orientation and BMI (Wilkinson et al., 2010; Wilkinson et al., 2019; Wilkinson et al., 2018; Wilkinson et al., 2017). Specifically, attachment anxiety 130 131 seems to reliably be related to an inability to engage in goal directed behaviours 132 when upset (i.e., an inability to disengage with upset; a form of emotion regulation difficulty), which is, in turn, related to stress induced eating and body mass index 133 134 (Wilkinson et al., 2018).

135 Considering the explanatory power of attachment orientation (and in particular 136 attachment anxiety) in understanding individual differences in eating behaviours as a 137 function of emotion regulation and stress, and the importance of the latter in the 138 aetiology of NES, across two US/UK studies, we tested a number of hypotheses to 139 examine whether NES could be explained, at least in part, by attachment anxiety.

140 In study 1, we first hypothesised that attachment anxiety would positively relate to NES and that this relationship would be mediated by disinhibited eating 141 142 behaviours (emotional/uncontrolled eating). Second, previous findings have shown that older participants were more likely to report higher scores on the Night Eating 143 144 Questionnaire compared to younger populations of participants across categories of 145 night eating severity (mild, moderate or full) (Nolan & Geliebter, 2017) and reported more NES symptoms (Nolan & Geliebter, 2019). Therefore, in an exploratory 146 hypothesis, we predicted that age would moderate the mediated relationship 147 148 between attachment anxiety and NES via emotional and uncontrolled eating, with a 149 stronger relationship between attachment anxiety and NES expected with older age.

Considering this, our recruitment strategies included both student and communitysampling in order to maximise age range.

In a second study which built on study 1, based on the qualitative accounts of the lived experience of NES described above (Shillito et al. 2018), we also considered a potential effect of NES on interpersonal relationships; specifically, we measured a "fear of negative evaluation of eating behaviours" to capture participants' feelings of guilt and shame around eating behaviours. We hypothesised that fear of negative evaluation of eating would mediate a relationship between NES and attachment anxiety.

159 In addition, given the importance of coping strategies for the characterisation of NES and because food is used by attachment anxious individuals as a form of 160 161 coping with negative emotion, across both studies, we explored coping strategies in 162 response to stress with a novel diagrammatic measure (described in detail below). 163 The advantage of including a diagrammatic approach such as this, is that it allows 164 participants to name and place coping strategies on the measure in a way that is 165 meaningful for them, relative to a central anchor point representing "me/the self". 166 This approach offers ease and flexibility of response (for example, participants may name a specific food, and place it in relation to another coping strategy that is more 167 168 or less important to them).

We predicted that individuals who had higher attachment anxiety scores and, in turn, higher scores on the Night Eating Questionnaire (NEQ) would be more likely to report that they used foods/eating as a coping strategy and that a pictorial representation of this coping strategy would be placed "closer to the self" on our tool. In study 1, we tested these hypotheses using a basic digital form of this measure (Distance Affect Regulation Mapping or DARM tool) (Kobori et al., 2020; Wilkinson &

Rowe, 2016) and in study 2 we tested these hypotheses using a more developed
digital form of this measure (re-named the Coping Strategies Assessment Tool or
CSAT) (Douglas, 2020).

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179 **2.0 Study 1**

180 **2.1 Method**

181 The hypotheses were pre-registered with the open science framework after data collection had commenced but prior to data analysis (https://osf.io/skztg/) and 182 183 the dataset is available via the open science framework 184 (https://osf.io/nf6qj/?view_only=942479ceb5634e269fc4f4bdaad1a5ee).

185 2.1.1 Participants

186 A total of 276 participants (male = 90, female = 183, nonbinary = 3) completed 187 the study (see Table 1 for sample characteristics). Four hundred and ninety-five 188 participants initiated the study, but 215 did not complete a sufficient number of key 189 questions to be included in the dataset. In addition, 1 participant reported a BMI score that was very low (12 kg/m²) and 3 participants reported a current or historic 190 191 eating disorder and, therefore, were removed. An opportunistic sampling strategy was used with current or historical diagnosis of an eating disorder and having 192 193 received bariatric-metabolic surgery as exclusion criteria. With 276 participants, 194 according to sample size estimations for the detection of a mediated effect at .8 power by Fritz and Mackinnon (2007), we were adequately powered to detect small 195 196 to medium effect sizes using bias-corrected boot-strapping.

197 The study included 78 participants who indicated living in the United Kingdom 198 (a mixture of student and community participants) and 198 participants who indicated 199 living in the United States. UK participants were recruited via social media, posters

200 and the local psychology departmental participant pool. US participants were 201 recruited from two populations. One consisted of undergraduate students (n = 88) 202 who volunteered via an online participant pool as one way to satisfy an introductory 203 psychology course research experience requirement. These students completed the 204 questionnaires in groups in a computer laboratory environment. The other consisted 205 of community members (n = 110) recruited by Qualtrics panel service and paid a 206 nominal amount to complete the study. For the latter, the only additional requirement 207 for participation was age >25 years old in order to sample age groups beyond that of 208 a student population.

Qualtrics employs procedures to ensure that the participants are actual people because paid studies can attract automated response programs or "bots" (Prince et al., 2012). In addition, records were screened for inappropriate responses to open-ended questions and unusually short duration times, both indications of fake participants (Prince et al., 2012). No evidence of "bot" respondents was detected. The responses of 13 participants were removed for not following task instructions correctly and were replaced by other respondents while data collection was active.

Ethics approval was obtained from the local human research ethics committees of the first and last authors who led on data collection.

218 2.1.2 *Measures*

219 2.1.2.1 *NES* was assessed using the Night Eating Questionnaire (NEQ) 220 (Allison et al., 2008), which is a 14-item scale assessing both behavioural and 221 psychological components of NES. The questionnaire comprises three sections. All 222 participants complete the first section. Participants only proceed to the second 223 section if they score above a "0" for the last question of the first section (Other than 224 only to use the bathroom, how often do you get up at least once in the middle of the

225 night?). Participants only proceed to the third section if they score above a "0" for the 226 last question of the second section (When you get up in the middle of the night, how 227 often do you snack?). Two additional questions regarding personal distress related 228 to night eating have been proposed (Allison et al., 2008) and were included in the present study. Items are scored on a 0-4 Likert scale, response anchors vary across 229 230 questions but tend to be from "Not at all/ Never" to "Extremely/ Always", except for 231 one question which has an additional option (question 7). Thirteen items are 232 summed to give a total score. The standardised Cronbach alpha for this sample was 233 0.86.

234 2.1.2.2. Attachment orientation was assessed using the short 12-item version of the Experiences in Close Relationships Questionnaire (ECR) (Lafontaine et al., 235 236 2016). Participants were asked to reflect on their relationships in general (as 237 opposed to specifically romantic relationships). This questionnaire contains two subscales of 6-items, one of which assesses attachment anxiety and the other which 238 239 assesses attachment avoidance. Participants rate the extent to which they agree with statements on a 7-point Likert scale anchored to the left with "strongly-disagree" 240 241 (1) and to the right with "strongly agree" (7). Subscale scores are calculated by averaging (mean) relevant items. The Cronbach's alpha for attachment anxiety was 242 243 0.89 and for avoidance anxiety was 0.80.

244 2.1.2.3 *Eating style* was assessed using the 18-item version of the Three-245 Factor Eating Questionnaire (TFEQ) (Karlsson et al., 2000) which comprises three 246 subscales; cognitive restraint (6-items) reflects the extent to which individuals 247 consciously apply restraint to their eating behaviour. Uncontrolled eating (9-items) 248 reflects the extent to which individuals feel that they lose control over their eating 249 behaviour. Emotional eating (3-items) reflects the extent to which an individual eats

in response to emotional states. Participants are asked to respond to statements as they apply to themselves on a 4-point (scored 1 - 4) Likert scale anchored from "definitely true" to "definitely false" or a variation of this scale dependent on question. Relevant items were summed to calculate subscale scores. The Cronbach's alpha for both uncontrolled eating and for emotional eating was 0.85.

255 2.1.2.4 Digital Distance Affect Regulation Mapping Tool (DARM) is a digital 256 version of a pilot measure (Kobori et al., 2020; Wilkinson & Rowe, 2016) based on 257 the "hierarchical mapping" approach (Rowe & Carnelley, 2005). However, this 258 version of the tool allows for the mapping of a range of internal and external affect 259 regulation strategies including seeking proximity to people (e.g., a romantic partner), practices (e.g., meditation), substances (e.g., food) or anything else that an 260 261 individual might use to manage their emotions at times of stress. Participants are 262 asked to reflect on the different ways that they manage stress and to list these 263 strategies. They are then asked to rate on a 100 mm visual analogue scale, how 264 effective they find each strategy for the management of stress (responding from not at all to extremely). Finally, they are asked to place these strategies on a "bulls-eye" 265 style diagram in relation to the centre, which is labelled "stressed me". They were 266 asked to arrange their strategies in a way that is meaningful to them and are advised 267 268 that those placed closer to the "stressed me" centre might be those that are relied on 269 more often or of more importance. This information can be quantified in terms of the 270 presence (or not) of a particular target strategy (here, this would be food/ eating 271 related strategies) and the distance of that strategy from the centre of the bulls-eye. 272 This version of the tool is coded in JavaScript and is presented to the respondents as part of the same Qualtrics survey as other measures. Respondents selected their 273 274 strategies from a drop-down list populated with their earlier responses, presented in

275 a randomised order, and then dragged a labelled icon across the "bulls-eye" diagram 276 to place them as they wished. They were free to select strategies in any order and 277 were free to return to adjust the position of strategies already placed. This allowed 278 the DARM to capture all of a respondent's strategies, and the relationships between strategies' positions at once. The final position, in units of pixels within the 500x500 279 280 pixel space of the DARM was recorded as was the time spent placing each strategy 281 and the number of times each strategy was selected and repositioned by the 282 respondent. For a depiction of the DARM tool see (Wilkinson & Rowe, 2016).

283 2.1.2.5 *Demographics* Participants were asked to report their age, gender and 284 whether they were a UK- or US-based respondent. They were asked to report 285 whether they had a current or historical diagnosis of an eating disorder or had 286 received bariatric-metabolic surgery. Finally, in order to calculate body mass index, 287 participants were asked to report their height and weight.

288 2.1.2.6 *Demand awareness* An open-text response question was included at 289 the end of the questionnaire (but prior to debriefing information) which asked 290 participants to indicate what they thought the study was investigating.

291 **2.1.3** *Procedure*

The study was hosted on Qualtrics survey software (Qualtrics, Provo, UT, 292 293 USA). Participants were recruited either through an anonymous link (advertised via 294 social media or posters), a researcher who provided access to the online 295 questionnaire via a computer laboratory or a Qualtrics online panel sample. They were asked to read information outlining the protocol for the study and asked to 296 297 provide informed consent via a tick box consent screen. Participants were asked to complete the DARM, the short Experiences in Close Relationships Questionnaire, 298 299 the Night Eating Questionnaire, the Three Factor Eating Questionnaire, demographic

questions and finally the demand awareness question. They were then provided witha debrief screen.

302 2.1.4. Data analysis

303 In accordance with recommendations from the Center for Open Science, we 304 conducted our analyses in two phases; the first phase contained confirmatory 305 analyses (i.e., those that directly speak to our pre-registered hypotheses). The 306 second phase contained exploratory analyses, those that were informed by the 307 results of our confirmatory analysis but were not a part of our initial set of 308 hypotheses. We have provided a supplementary file where analyses and additional 309 information can be found relating to hypotheses that are listed in our pre-registration 310 but are not included here.

All models presented here were conducted using the PROCESS v3.1 (Hayes, 2017) add in for SPSS 26 (IBM Corp. Armonk NY). All PROCESS models were set up to run 5000 bootstrap samples and to control for covariates at the level of both the mediator and the outcome. Notably, a significant mediated relationship is indicated if the lower and upper confidence intervals (LLCI and ULCI, respectively) do not cross zero – p-values are generally not produced for the indirect (mediated) pathway.

2.1.4.1 *Confirmatory analyses* First, we examined whether attachment anxiety positively related to NES and whether this relationship was mediated by disinhibited eating behaviours (emotional and uncontrolled eating). We conducted a parallel multiple mediation model using PROCESS model 4. This allowed for the simultaneous assessment of both emotional and uncontrolled eating as potential mediators of a relationship between attachment anxiety and NES. For this model, attachment anxiety was the predictor, NES was the outcome and emotional and

uncontrolled eating were parallel mediators. Following previous research which
included similar models, attachment avoidance, age, gender and location were
included as covariates in our model (Wilkinson et al., 2018).

328 Using a binary logistic mediation model (PROCESS model 4), we examined whether higher NES scores mediated a positive relationship between attachment 329 anxiety and greater likelihood of reporting eating/ food as a coping strategy on the 330 331 DARM tool. In addition, for those who listed food/ eating as a coping strategy, we also conducted this model with distance from the centre (denoting greater 332 333 significance of a coping strategy to an individual) as the outcome variable. In both models, attachment avoidance, gender, age and location were included as 334 covariates. 335

336 2.1.4.2 Exploratory analyses In order to examine a possible moderation effect of age on the mediated relationship between attachment anxiety and night eating via 337 emotional and uncontrolled eating, we conducted a moderated mediation model 338 339 (PROCESS model 59). This model tests for moderation for all relationships in the mediation model (i.e., between the predictor and the mediator, the mediator and the 340 341 outcome and the direct relationship between the predictor and outcome). Notably, the current sample had an age range of 62 years with a minimum age of 18 years 342 343 old and a maximum age of 80 years old.

344

345 **2.2 Results**

346 2.2.1 Descriptive statistics

347 Cohort level means for each measure can be found in Table 1.

348 2.2.2 Confirmatory analyses

349 2.2.2.1 The relationship between attachment anxiety and NES A significant 350 relationship between attachment anxiety and night eating was evident when mediators were not included in the model (total effects; B = 2.27, SE = 0.27, 95% CI: 351 352 1.74 - 2.79, p < .001). When mediators were included in the model, this direct relationship remained significant (direct effects; B = 1.74, SE = 0.26, 95% CI: 1.22 -353 354 2.26, p < .001) and significant indirect relationships via both uncontrolled (B = 0.16, 355 SE = 0.09, 95% CI: 0.001 - 0.35) and emotional eating (B = 0.37, SE = 0.12, 95% CI: 0.15 - 0.63) were found. There were no significant effects of any of the covariates 356 357 and the overall model was significant, F(7,268) = 19.71, p < .001; R^2 for the total effects model (mediators not included) was .24 and R^2 for the mediated model was 358 .34. 359

360 2.2.2.2 Eating to cope Mediation analysis using binary logistic regression 361 showed that there was no significant direct effect of attachment anxiety on likelihood of reporting food as a coping strategy on the DARM tool (log-odds = 0.05, SE = 0.10, 362 p = 0.63, 95% CI: -0.15 - 0.25) and no mediated effect of attachment anxiety on 363 likelihood of reporting food as a coping strategy on the DARM tool via night eating 364 questionnaire score (log-odds = 0.03, SE = 0.05, 95% CI: -0.07 - 0.13). Only gender 365 (and no other covariate) was significantly related to reporting of eating/food as a 366 367 coping strategy (log-odds = 1.06, SE = 0.27, p < .001, 95% CI: 0.53 - 1.61). A post-368 hoc chi-square test showed that female participants were significantly more likely to 369 have listed food/eating as a coping strategy on the DARM tool compared to male participants, $\chi^2(2, N = 276) = 24.7$, p < .001. The mediation model was significant (p 370 < .001) and Cox and Snell R^2 for the mediated model was .10 (total effects models 371 are not produced when the outcome measure is dichotomous). 372

373 Mediation analysis (n = 128) showed that there was no significant direct effect 374 of attachment anxiety on distance from the centre that food/eating was placed on the DARM tool (B = 7.44, SE = 4.94, p = .13, 95% CI: -2.32 - 17.22), total effect (B =375 376 4.58, SE = 4.6, p = .32, 95% CI: -4.56 - 13.72) or mediated effect via night eating questionnaire score (B = -2.86, SE = 2.49, 95% CI: -8.36 - 1.58). Attachment 377 378 avoidance was the only covariate that was significantly related to the distance from the centre that food/eating was placed on the DARM tool (B = -11.91, SE = 5.25, p =379 .025, 95% CI: -22.30 - -1.50). The R^2 for the total effects model was .10 and the R^2 380 381 for the mediated model was .12. Overall, the mediated model was significant (p =.016). 382

383

384 2.2.3 Exploratory analyses

385 Age as a moderator of the mediated relationship between attachment anxiety and NES. The model for predicting night eating score was statistically significant, 386 F(10, 265) = 15.24, p < .001; $R^2 = 0.37$ (total effects models are not available for 387 PROCESS model 59). When age was entered as a moderator, emotional eating and 388 389 uncontrolled eating were not significant mediators although emotional eating did predict elevated night eating score. Age was not a significant predictor of night eating 390 391 score, emotional eating, or uncontrolled eating but there was a significant age X 392 attachment anxiety interaction effect on night eating score (B = 0.05, SE = 0.02, p =.002, 95% CI: 0.02 - 0.08). The test of highest order unconditional interaction 393 indicated that the model fit was significantly improved due to the age X attachment 394 anxiety interaction, F(1, 265) = 9.40, p = .002; R^2 change = 0.02. Age did not interact 395 with either mediator. The conditional direct effect of attachment anxiety on night 396 397 eating score was significant across age values (see Table 2). The conditional indirect effect of attachment anxiety on night eating score through emotional eating was
significant at lower ages but not at the higher suggesting moderated mediation (see
Table 2). The moderated mediation is presented in Figure 1.

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403

402 2.3 Interim Discussion

For the first time, a direct relationship between attachment anxiety and NES 404 405 has been shown. The relationship was present in an international (US, UK) sample of undergraduate students and individuals from the community. Furthermore, as 406 407 predicted, this relationship was mediated by disinhibition of eating in the form of 408 uncontrolled and emotional eating. The association between emotional eating as 409 measured by the TFEQ is consistent with previous work which has demonstrated a positive association between emotional eating (measured by the Dutch Eating 410 411 Behavior Questionnaire) and night eating in students (Nolan & Geliebter, 2012). The 412 positive relationship between uncontrolled eating and NES in the general population 413 (i.e., those without diagnosed eating disorder) is novel.

Despite the identification of two significant mediators of the relationship 414 between attachment anxiety and NES, the direct effect between these factors 415 416 remains significant within the mediated model. This suggests that the mediators we 417 have included do not fully explain the relationship between attachment anxiety and NES and other mediators are likely to exist. The qualitative study by Shillito et al. 418 419 (2018) examined the relationship between NES and the experience of emotion in 420 adults who met the diagnostic criteria for moderate or full NES and were accessing a 421 weight management service. They found that when "acknowledging the 422 consequences of night eating", participants talked about social effects, in particular in 423 difficulties in relationships. While Fischer et al. (2012) reported that compared to 424 healthy controls and individuals living with obesity (without NES), individuals with

NES were more affected by social stress (including social overload, lack of social recognition, social tension and social isolation). Furthermore, for the NES group, Fischer et al. (Fischer et al., 2012) reported a correlation between ratings of social stress and rated distress and impairment due to NES symptoms. It is notable that the centrality of social cues in these findings is similar to the hyper-vigilance that is characteristic of attachment anxiety.

431 One possibility is that the experience of NES alters attachment anxiety in 432 terms of fear of abandonment (i.e., reverse causality whereby individuals are 433 concerned that the consequences of NES will cause others to abandon them). 434 Indeed, whilst adult attachment has generally been viewed as a stable trait across 435 time with changes only tending to occur in response to specific events (Waters et al., 436 2000), increasing evidence suggests that shifts in attachment orientation can take 437 place readily (Fraley et al., 2011), occurring in response to relationship status and 438 across specific periods of life such as adolescence (Chopik et al., 2017). Therefore, 439 in study 2 we sought to explore this reversed relationship (albeit cross-sectionally) 440 with the inclusion of a mediator reflecting the fear of negative evaluation by others of 441 night eating behaviours as well as the addition of demographic questions to provide context about the sample's living situation (i.e., living alone or co-habiting) and if co-442 443 habiting, the closeness of that interpersonal relationship.

Notably age was a significant moderator of the direct relationship between attachment anxiety and NES, specifically those in our older age category who also had a higher attachment anxiety score, were more likely to have a higher night eating score than those in our younger age category also with a higher attachment anxiety score. In general, research has suggested that attachment anxiety is higher in younger individuals compared to older individuals (Chopik et al., 2017). One

450 possibility is that our older age group with higher attachment anxiety scores may 451 represent a more persistent attachment insecure group who are also more 452 vulnerable to other psychopathologies including NES. Indeed, there is evidence that 453 NES in older groups is more associated with psychopathologies than it is in younger 454 groups (Nolan & Geliebter, 2016).

455 Inconsistent with our hypotheses, we failed to find a relationship between 456 attachment anxiety, night eating score and likelihood of reporting eating to cope on 457 our novel DARM tool. For those who did report eating to cope, we also failed to find 458 a relationship between attachment anxiety, night eating score and placement of 459 "eating to cope" on the DARM. This is despite the finding that emotional eating scores were associated with both placement of eating to cope and its distance from 460 461 the centre on the DARM, suggesting basic validity of the use of the tool in this 462 context (see supplementary file). It is likely that night eating scores capture a more 463 heterogenous set of characteristics than emotional eating score alone and therefore 464 spontaneous recognition of eating behaviours as a coping strategy as a function of night eating score may be less likely. For example, cravings or urges to eat snacks 465 466 after supper are a characteristic of NES but the reason the individual thinks they experience those cravings or urges is not stipulated as part of the Night Eating 467 468 Questionnaire. Another possibility is that the DARM tool was not received by 469 participants as intended and therefore measurement noise affected our results, with only the strongest relationships remaining evident (i.e., with emotional eating). 470 Elsewhere, we have developed and improved the clarity of instructions/ wording and 471 472 the visual representation of the tool (Douglas, 2020). This revised tool was re-named the Coping Strategies Assessment Tool (CSAT) and was used instead of the DARM 473 474 in study 2.

475 **3.0 Study 2**

476 In study 2 we sought to extend our findings by first testing an alternative explanation for the direct effect between attachment anxiety and night eating score 477 478 based on reverse causality, whereby the experience of interpersonal shame as a 479 consequence of NES would alter an individuals' attachment orientation, in particular 480 attachment anxiety. Considering our exploratory finding from study 1 that age was a 481 moderator of the relationship between attachment anxiety and night eating 482 questionnaire score, we included age as a moderator in this model. We 483 hypothesised that a positive relationship between night eating score and attachment anxiety would be significantly mediated by a measure of fear of negative evaluation 484 485 of eating behaviour and that older age would result in a stronger relationship 486 between night eating score and attachment anxiety.

487 Secondly, we also further tested the role that food plays in coping in relation 488 to attachment anxiety and night eating using the CSAT, a more user-friendly version 489 of the DARM tool. Hypotheses were identical to those listed in study 1.

490 Finally, in an exploratory analysis we sought to extend our main finding from study 1 491 that showed that the relationship between attachment anxiety and night eating was mediated by both emotional and uncontrolled eating but did not further explore how 492 493 these mediators might relate to each other. Indeed, previous work on the relationship 494 between attachment orientation and eating behaviours has modelled an interrelationship between emotional and uncontrolled eating (Wilkinson et al., 2019). 495 Specifically, we examined whether our results were consistent with the "escape from 496 497 self-awareness theory of overeating" (Heatherton & Baumeister, 1991) which suggests that some forms of disinhibited eating (binge eating in their paper) may 498 occur with a narrow focus on "immediate sensation" from food as a form of 499

⁵⁰⁰ "motivated escape from meaningful self-awareness". As described by van Strien ⁵⁰¹ (2018), escape from self-awareness theory suggests that uncontrolled eating may ⁵⁰² occur when some people (e.g., emotional eaters) narrow their level of attention to the ⁵⁰³ presence of food and become vulnerable to external cues to overeat. Thus, we ⁵⁰⁴ hypothesised that attachment anxiety and night eating would be *serially* mediated by ⁵⁰⁵ emotional eating followed by uncontrolled eating.

506 **3.1 Method**

507 The hypotheses were pre-registered with the open science framework after 508 data collection had commenced but prior to data analysis (https://osf.io/8zyas) and 509 the dataset is available via the open science framework

510 (https://osf.io/nf6qj/?view_only=942479ceb5634e269fc4f4bdaad1a5ee).

511 3.1.1 Participants

512 Four hundred and eighty-six participants (male = 177, female = 309) 513 completed the study. Five hundred and eight participants initiated the study in total, 514 but 22 did not answer a sufficient number of key questions to be included in the 515 dataset. An opportunistic sampling strategy was used and recruitment methods were 516 similar to study 1. The final sample included 267 participants who indicated living in the UK (98 via Qualtrics panel) and 207 participants who indicated living in the US 517 518 (95 via Qualtrics panel). 12 participants (3 in UK and 9 in US) selected "other" for 519 country in which they reside (2 and 9 were students respectively). One hundred and 520 twelve of the US participants and 91 of the UK participants were students, remaining 521 participants non-student community members. Additional sample were 522 characteristics are presented in Table 3.

523 **3.1.2** *Measures*

Measures As in study 1, night eating was assessed using the Night Eating Questionnaire; for study 2, the standardised reliability coefficient was .75. Attachment orientation was measured using the Experiences in Close Relationships Questionnaire; the Cronbach's alpha for attachment avoidance and attachment anxiety were .85 and .89 respectively. Eating styles were measured using the 18item version of the Three Factor Eating Questionnaire. The reliability for uncontrolled eating scale was .81 and for the emotional eating scale was .84.

3.1.2.1 Affect Regulation Affect regulation was measured by the Coping
Strategy Assessment Tool (CSAT) (Douglas, 2020). See description of DARM in
study 1 for an overview of how the tool works. This updated version of the tool had
improved clarity of instructions and visual representation of the tool.

535 3.1.2.2 Fear of negative evaluation of eating behaviour In order to assess 536 concern for being evaluated negatively for eating, 7 items from the Brief Fear of Negative Evaluation Scale-Revised (Carleton et al., 2006) were utilized and 537 538 modified by changing the wording to refer to eating behaviour. For example, "I worry about what other people will think of me even when I know it doesn't make any 539 540 difference" was changed to "I worry about what other people will think of my eating even when I know it doesn't make any difference." Items were summed to produce a 541 542 total scale score. Cronbach's alpha for this measure was .95.

543 3.1.2.3 *Closeness of Co-habiting Relationships* The participants were asked 544 to indicate whether they lived alone or with others (options: parents, friends, romantic 545 partner, or roommates who are not friends) and the degree of closeness with those 546 they live with (options: not at all close, slightly close, moderately close, very close, or 547 extremely close).

548 **3.1.3** *Procedure*

549 The procedure was the same as that described for Study 1 except participants 550 completed the CSAT in place of the DARM, the measure of fear of negative 551 evaluation of eating behaviour and questions about their living situation.

552 3.1.4 Data Analysis

Confirmatory analyses included the following to test pre-registered 553 554 hypotheses. First, we examined whether night eating would predict higher 555 attachment anxiety via fear of negative evaluation of eating with age as a moderator (PROCESS Model 59). For this model, night eating was the predictor, attachment 556 557 anxiety was the outcome and fear of negative evaluation of eating was the mediator. 558 Age was included as a moderator (of every relationship in the mediated model). Following previous research which included similar models, attachment avoidance, 559 560 gender and location were included as covariates in our model (Wilkinson et al., 561 2018).

Secondly, using a binary logistic mediation model (PROCESS model 4), we 562 563 examined whether higher NES scores mediated a positive relationship between attachment anxiety and greater likelihood of reporting eating/ food as a coping 564 565 strategy on the CSAT tool. In addition, for those who listed food/ eating as a coping strategy (excluding 56 cases with unrecorded distance data), we also conducted this 566 567 model with distance from the centre (denoting greater significance of a coping 568 strategy to an individual) as the outcome variable. In both models, attachment 569 avoidance, gender, age and location were included as covariates.

570 Finally, an exploratory analysis was conducted to examine whether there was 571 a serial mediation (PROCESS model 6) of the relationship between attachment 572 anxiety and night eating via emotional followed by uncontrolled eating. Following 573 previous research which included similar models, attachment avoidance, age,

574 gender, and location were included as covariates in our models (Wilkinson et al., 575 2018).

576 Again, analyses and additional information relating to hypotheses that are 577 listed in our pre-registration but are not included here can be found in our 578 supplementary file.

579 **3.2 Results**

580 3.2.1 Descriptive statistics

581 Cohort level means for each measure can be found in Table 3.

582 **3.2.2** *Confirmatory analyses*

3.2.2.2 Association between Night Eating and Attachment Anxiety Mediated 583 584 by Fear of Negative Evaluation of eating behaviour. Age was not a significant moderator of any of the relationships within the mediated model (night eating to fear 585 of negative evaluation of eating (p = .62), night eating to attachment anxiety (p = .51) 586 587 or fear of negative evaluation to attachment anxiety (p = .46)). A significant direct 588 relationship between night eating and attachment anxiety was evident at every age 589 percentile tested (see table 4). A significant indirect relationship from night eating to 590 attachment anxiety via fear of negative evaluation was also evident at every age percentile tested (see table 4). Location was not a significant covariate but 591 592 attachment avoidance (B = -.10, SE = 0.05, p = .03, 95% CI: -0.19 - -0.01) and gender (B = 0.27, SE = 0.11, p = .02; 95% CI: 0.04 – 0.50) were significant covariates 593 594 within the model. A post hoc independent samples t-test showed that female participants had a higher mean attachment anxiety score (M = 4.12, SE = 0.08) 595 596 compared to male participants (M = 3.64, SE = 0.11; t(484) = -3.53, p < .001). The overall mediated model was significant, p < .001; $R^2 = .32$ (total effects models are 597 598 not available for PROCESS model 59).

599 3.2.2.3 Eating to Cope (CSAT) Mediation analysis using binary logistic regression showed that there was a significant direct effect of attachment anxiety on 600 likelihood of reporting food as a coping strategy on the CSAT tool (log-odds = 0.24, 601 602 SE = 0.08, p = 0.002, 95% CI: 0.08 - 0.39) but no mediated effect of attachment anxiety on likelihood of reporting food as a coping strategy on the CSAT tool via 603 604 night eating (log-odds = 0.02, SE = 0.03, 95% CI: -0.03 - 0.08). Only age (and no other covariate) was significantly related to reporting of eating/food as a coping 605 strategy (log-odds = -0.01, SE = 0.01, p = .02, 95% CI: -0.03 - -0.002). The 606 607 mediation model was significant (p < .001) and Cox and Snell R^2 for the mediated model was .07 (total effects models are not produced when the outcome measure is 608 609 dichotomous).

610 Mediation analysis (n = 114) showed that there was no significant direct effect 611 of attachment anxiety on distance from the centre that food/eating was placed on the CSAT tool (B = 4.81, SE = 4.41, p = .28, 95% CI: -3.93 - 13.54; total effect: B = -0.2, 612 613 SE = 4.23, p = .96, 95% CI: -8.6 - 8.19). However, there was a significant indirect effect of attachment anxiety on distance from the centre that food/eating was placed 614 on the CSAT via night eating (B = -5.01, SE = 2.18, 95% CI: -9.82 - -1.34). 615 Attachment avoidance, age, gender and location were not significant covariates 616 within the model. The R^2 for the total effects model was .03 and the R^2 for the 617 618 mediated model was .11. Overall, the mediated model just missed statistical significance (p = .053). 619

620

621 3.2.3 Exploratory analyses

622 3.2.3.2 Serial Mediation: Effect of attachment anxiety via emotional and 623 uncontrolled eating In order to examine whether the results were consistent with the

624 escape from self-awareness model, a serial mediation analysis examining whether attachment anxiety predicted night eating via an increase in emotional eating which 625 itself predicts uncontrolled eating. A significant direct effect between attachment 626 627 anxiety and night eating was evident for both models excluding mediators (total effects, B = 1.82, SE = 0.20, p < .001; 95% CI: 1.41 – 2.22) and including mediators 628 (B = 1.29, SE = 0.20, p < .001; 95% CI: 0.89 -1.69). The indirect effect between 629 attachment anxiety and night eating via emotional and uncontrolled eating was 630 631 significant (B = 0.24, SE = 0.07, 95% CI: 0.12 - 0.40). Within the mediated model 632 (including both mediators), the indirect effect from attachment anxiety to night eating via uncontrolled eating alone was significant (B = 0.19, SE = .07, 95% CI: 0.07 -633 0.33) but was not significant via emotional eating alone (B = 0.10, SE = .08, 95% CI: 634 635 -0.06 - 0.27). The overall model was statistically significant (p < .001), the R^2 for the 636 total effects model was .23 and for the mediated model was .32. In the mediated model, gender and age were not statistically significant covariates but attachment 637 avoidance (B = 0.74, SE = 0.21, 95% CI: 0.32 - 1.16) and country of residence (B =638 1.7, SE = 0.43, 95% CI: 0.85 - 2.56) were statistically significant covariates. A post-639 hoc independent samples t-test showed that participants located in the United States 640 scored significantly higher on night eating (M = 16.6, SE = .49) than participants 641 642 located in the United Kingdom (M = 13.82, SE = .41; t(472) = -4.38, p < .001).

643

644 4.0 Discussion

645 Consistent with our pre-registered hypotheses and across two studies, we 646 showed for the first time that attachment anxiety was a significant predictor of night 647 eating. Furthermore, across both studies, we showed that this relationship was 648 significantly mediated by measures of disinhibited eating (emotional and uncontrolled 649 eating). We also tested an alternative theoretically driven (escape from self-650 awareness theory; Heatherton & Baumeister, 1991) serial mediation model that allowed for a nuanced indirect pathway incorporating an inter-relationship between 651 652 emotional eating and uncontrolled eating. We showed an indirect pathway which suggests that attachment anxiety may lead to night eating by increasing eating when 653 654 experiencing negative affect which, in turn, elevates uncontrolled eating. In both 655 cases, these models accounted for just over 30% of the variance associated with 656 night eating.

657 In both studies, despite the inclusion of significant mediator(s) in our models, the direct relationship between attachment anxiety and NES remained significant, 658 suggesting that a portion of the variance remained unaccounted for by our 659 660 mediator(s). It is possible that whilst affect regulation is an important facet of NES, 661 this does not reflect the full aetiology of the proposed eating disorder and how it may relate to attachment anxiety. Future studies might consider the inclusion of potential 662 663 additional mediators addressing depression, anxiety and sleep quality which have all been associated with NES (Rogers et al., 2006; Sevincer et al., 2016) and 664 attachment anxiety (Adams et al., 2014) separately, but not as mediators of a 665 relationship between the two. 666

In study 2 we also considered a reversed relationship between attachment anxiety and night eating score with a fear of negative evaluation of eating behaviour as a potential mediator. Consistent with Shillito et al. (2018), we found a significant indirect relationship whereby night eating score was a significant predictor of fear of negative evaluation of eating and this, in turn, was a significant predictor of attachment anxiety. Overall, it is likely that more complex bidirectional relationships exist between night eating and attachment anxiety and future research might explore

674 this possibility further using longitudinal approaches. One area that might be particularly fruitful is consideration of directionality of inter-relationships (e.g., a 675 vicious cycle) between factors, for example, attachment anxiety is associated with 676 677 emotional eating and uncontrolled eating that are associated with night eating, which leads to a fear of negative evaluation of eating and is associated with higher 678 679 attachment anxiety. Moreover, from a theoretical perspective, fear of negative 680 evaluation of eating could be considered an "ego threat" - an aversive selfperception which causes distress. This is itself a key component of the escape from 681 682 self-awareness theory (mentioned above), as this distress leads to emotional eating 683 and uncontrolled/external eating via the mechanisms described above (Heatherton & Baumeister, 1991). 684

685 More generally, our findings contribute to a body of research linking 686 attachment orientation to eating disorders (Oldham-Cooper et al., 2021; Tasca, 2019; Tasca & Balfour, 2014; Ward et al., 2000) but that has, to date, neglected 687 688 NES. The benefit of understanding NES as an outcome of a broader set of processes that underpin the aetiology and maintenance of disordered eating is in 689 690 terms of opportunities for intervention. For example, Tasca et al. (Tasca et al., 2006) found that attachment orientation predicted differential outcomes for two group 691 692 therapy protocols for patients with binge eating disorder; for those participants 693 randomised to group psychodynamic interpersonal psychotherapy, higher attachment anxiety was associated with improvements in binge eating post-694 treatment. Whereas, for those participants randomised to group cognitive 695 696 behavioural therapy, lower attachment anxiety was associated with improvements in binge eating post treatment. In the latter condition, attachment avoidance was also 697 698 positively associated with drop-out rate.

699 Moreover, protocols that specifically target insecure attachment orientation by 700 "boosting" attachment security (Mikulincer & Shaver, 2007; Rowe et al., 2020) may 701 represent a promising avenue for future research into the effective treatment of night 702 eating syndrome. In other populations, such protocols have shown early evidence for 703 efficacy. For example, Carnelley and colleagues (2018) found that outpatients with 704 depressive disorders who were repeatedly primed with attachment security reported 705 lower depressed and anxious mood following the last prime. Repeated security 706 priming has also been shown to decrease paranoia and negative affect, and improve 707 help seeking in a sample with high levels of non-clinical paranoia (Newman-Taylor et 708 al., 2021). Furthermore, preliminary work has shown that a single administration of 709 security priming is associated with a lower intake of cookies compared to a single 710 administration of an attachment anxiety prime (Wilkinson et al., 2013).

711 Across our two studies we also incorporated a novel tool (the DARM in study 712 1 and a developed version of the DARM, named the CSAT, in study 2) which asks 713 participants to consider and prioritise their approaches to coping with negative emotion and stress. In both studies we failed to find a relationship between 714 715 attachment anxiety, night eating and likelihood of naming eating as a coping 716 strategy. Although in study 2, for those participants who reported eating as a coping 717 strategy, we showed a significant indirect relationship with higher attachment anxiety 718 relating to the placement of eating to cope closer to the centre of our tool (which 719 represents the self) via night eating. However, the overall model just missed significance and only accounted for 11% of the variance associated with placement 720 721 of eating to cope. One possibility is that, for this analysis, we were underpowered because only a sub-set of our sample could be included in this analysis due to a 722 723 need to have reported eating to cope in the first place and some missing data.

724 Notably, emotional eating was significant predictor of naming and prioritisation 725 of eating as a coping strategy (see supplementary file). Therefore, it may be that those scoring higher on the Night Eating Questionnaire may not spontaneously 726 727 attribute eating behaviours to "coping" and coping may not be the most salient feature of night eating. Indeed, it is notable that in both studies, this tool was 728 729 completed prior to being specifically asked about eating behaviours in the context of 730 the Night Eating Questionnaire or the Three Factor Eating Questionnaire to afford a 731 "spontaneous" response. This finding may highlight the importance of considering 732 individuals' attribution of behaviours and how and why they may differ from existing 733 theoretical models as well as the possibility of a broader pattern of coping 734 behaviours that may co-exist.

735 The current studies are associated with a number of limitations. Our approach 736 was cross-sectional and therefore directionality and causality cannot be determined. 737 We relied on self-report questionnaires which can be prone to bias. Future studies 738 might consider other methodologies of exploring relationships between our key concepts, for example, the "gold standard" for the assessment of attachment 739 740 orientation is the "adult attachment interview" (George et al., 1985). In addition, 741 within study 2, our assessment of "fear of negative evaluation of eating behaviour" 742 did not ask specifically about fear of negative evaluation of *night* eating behaviours, 743 rather it asked about eating behaviour more generally. A consequence of this may be an overestimation of the relationship between these two constructs whereby 744 745 participants may engage in night eating and report fear of negative evaluation of 746 eating behaviour but not as it relates to night eating (i.e., it may relate to other eating occasions). A future study may consider investigating this possibility further by 747 748 adapting our measure to focus on night eating specifically.

Finally, we relied on convenience sampling and although we sampled participants with a range of responses on our key measures, future studies might consider specifically recruiting a group of patients with a night eating syndrome diagnosis with a control group for comparison with respect to attachment anxiety.

753

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759

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767

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769

- 5.0 References
- 772
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- 929 930

931 932 933 Table 1 934 935 Sample characteristics for study 1

Gender	Women	66.3%
	Men	32.3%
	Non-binary	1.1%
Country	UK	28.3%
	USA	71.7%
TFEQ*	Mean	SD
Emotional Eating	6.97	2.42
Uncontrolled Eating	20.42	5.72
ECR		
Attachment Anxiety	4.16	1.50
Attachment Avoidance	3.43	1.19
NEQ	16.12	6.98
BMI	27.44	7.52
Age	32.80	16.85

*The mean emotional and uncontrolled eating scores provided are subscale scores averaged
(mean) across participants, the subscale scores themselves were calculated by summing
relevant items. However, given item-number differences across these subscales, this

940 information does not allow for their easy comparison. Therefore, we also provide the

941 subscale scores averaged (mean) across participants but when the subscales are calculated by

averaging (mean) relevant items. Emotional eating (Mean = 2.32, SD = 0.80) and

943 uncontrolled eating (Mean = 2.27, SD = .64).

2.81

Table 2. Conditional direct and indirect effects of attachment anxiety on NES atvalues of the moderator (age) with 95% confidence interval in study 1.

Conditional Direct Effect of Attachment Anxiety on NEQ Score						
Age	В	SE	p	LLCI	ULCI	
19	1.09	0.33	.001	0.43	1.75	
24.5	1.35	0.29	<.0001	0.78	1.92	

Conditional Indirect Effect Via Uncontrolled Eating Mediator

0.44

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Age	В	Boot SE	LLCI	ULCI	
19	0.09	0.08	-0.02	0.30	
24.5	0.12	0.08	-0.01	0.31	
55	0.34	0.28	-0.14	0.96	

<.0001

1.94

3.68

conditional maneet Enect via Enotional Eating Mediator					
Age	В	Boot SE	LLCI	ULCI	
19	0.37	0.15	0.10	0.70	
24.5	0.37	0.14	0.13	0.65	
55	0.22	0.24	-0.21	0.75	

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977 Figure 1
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979 The direct and indirect (via emotional eating) effects of attachment anxiety on NEQ score as moderated by age for study 1. Coefficients increase across age for the direct pathway.
981



1003 Table 3

1004

1005 Sample characteristics in study 2

1006

Gender	Women	63.6%
	Men	36.4%
Country	UK	54.9%
	USA	42.6%
	Other	2.5%
Co-habitation		
Live with?	Alone	14.6%
	Parents	28.4%
	Friends	18.1%
	Partner	35.4%
	Roommate	3.5%
How close?	Not at all	1 5%
How close!		1.5%
	Moderately	2.7%
	Verv	30.8%
	Extremely	52.5%
TFEQ*	Mean	SD
Emotional Eating	6.43	2.39
Uncontrolled Eating	18.98	5.49
ECR		
Attachment Anxiety	3.94	1.47
Attachment Avoidance	3.51	1.26
NEQ	15.15	7.03
BMI	26 01	6 92
2	20.01	0.02
Age	37.13	18.61

* The mean emotional and uncontrolled eating scores provides are sub-scale scores averaged
 (mean) across participants, the subscale scores themselves were calculated by summing

1009 relevant items. However, given item-number differences across these subscales, this

1010 information does not allow for their easy comparison. Therefore, we also provide the

subscale scores averaged (mean) across participants but when the subscales are calculated by

averaging (mean) relevant items. Emotional eating (Mean = 2.14, SD = 0.80) and

1013 uncontrolled eating (Mean = 2.11, SD = .61).

- 1015 Table 4

1017 Conditional effects of NEQ on attachment anxiety via fear of negative evaluation at 1018 values of the moderator (age) with 95% confidence interval in study 2.

Conditio	Conditional Direct Effect of NEQ Score on Attachment Anxiety					
Age	В	SE	р	LLCI	ULCI	
19	0.04	0.01	.001	0.02	0.07	
33	0.05	0.01	<.0001	0.03	0.07	
60	0.06	0.01	.0001	0.03	0.09	

Conditional Indirect Effect Via Fear of Negative Evaluation						
Age	В	Boot SE	LLCI	ULCI		
19	0.03	0.01	0.02	0.05		
33	0.03	0.01	0.02	0.04		
60	0.02	0.01	0.01	0.04		

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1031
1032 Figure 2
1033
1034 Serial Mediation model of the association between attachment anxiety and NEQ via
1035 emotional eating and uncontrolled eating in study 2.
1036
1037

