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Tylka, Tracy L. and Calogero, Rachel M. and Danielsdottir, S. (2015) Is intuitive eating the same as flexible dietary control? Their links to each other and well-being could provide an answer. *Appetite*, 95 . pp. 166-175. ISSN 0195-6663.

DOI

<https://doi.org/10.1016/j.appet.2015.07.004>

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Document Version

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1 Running Head: INTUITIVE AND RESTRAINED EATING

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Is Intuitive Eating the Same as Flexible Dietary Control?

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Their Links to Each Other and Well-being Could Provide an Answer

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This is the **accepted version** of this paper.

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The **final definitive version** can be found here:

18

Tylka, T.L., Calogero, R.M., & Danielsdottir, S. (2015). Intuitive eating and dietary restraint:
19 Oxymoron or tautology? Their links to one another and wellbeing could provide an
20 answer. *Appetite*, 95, 166-175.

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Abstract

Researchers have found that rigid dietary control is connected to higher psychological distress, including disordered and disinhibited eating. Two approaches have been touted by certain scholars and/or health organizations as healthier alternatives: intuitive eating and flexible control—yet these approaches have not been compared in terms of their shared variance with one another and psychological well-being (adjustment and distress). The present study explored these connections among 382 community women and men. Findings revealed that intuitive eating and flexible control are inversely related constructs. Intuitive eating was related to lower rigid control, lower psychological distress, higher psychological adjustment, and lower BMI. In contrast, flexible control was strongly related in a positive direction to rigid control, and was unrelated to distress, adjustment, and BMI. Further, intuitive eating incrementally contributed unique variance to the well-being measures after controlling for both flexible and rigid control. Flexible control was positively associated with psychological adjustment and inversely associated with distress and BMI only when its shared variance with rigid control was extracted. Collectively, these results suggest that intuitive eating is not the same phenomenon as flexible control, and that flexible control demonstrated substantial overlap and entanglement with rigid control, precluding the clarity, validity, and utility of flexible control as a construct. Discussion addresses the implications of this distinction between intuitive eating and flexible control for the promotion of healthy eating attitudes and behaviors.

Keywords: intuitive eating, flexible control, rigid control, eating disorders, food preoccupation, psychological well-being

Is Intuitive Eating the Same as Flexible Dietary Control?

Their Links to Each Other and Well-being Could Provide an Answer

Eating restraint, defined as a continued attempt to cognitively control eating behavior in order to lose weight or prevent weight gain (Stunkard & Messick, 1985), has been widely studied in its connections to disordered eating and body mass. In general, eating restraint does not lead to long-term weight reduction, a trend that is especially noticeable within methodologically sound studies (Mann et al., 2007). Some inconsistent findings have emerged, however. Longitudinal designs have shown that eating restraint increases weight gain and disordered eating among children (Birch & Fisher, 2005; Birch, Fisher, & Davison, 2003), adolescents (Neumark-Sztainer et al., 2006; Neumark-Sztainer, Wall, Haines, Story, & Eisenberg, 2007), and adults (Chaput et al., 2009; van Strien, Herman, & Verheijden, 2014), leading the researchers of these studies to warn against prescribing eating restraint to control food intake and weight. Yet, select interventions promoting caloric restriction have recently been found to decrease binge eating, thin-ideal internalization, negative affect, weight gain, and other bulimic symptoms among female participants (Stice, Marti, Spoor, Presnell, & Shaw, 2008; Stice, Shaw, Burton, & Wade, 2006), prompting the researchers of these studies to advocate for prescribing eating restraint.

What could account for these discrepant findings? Perhaps the answer lies in how eating restraint is conceptualized and measured. Eating restraint is most often considered as a unitary construct, with little regard for differences in levels or forms of restraint. Yet, in as early as 1991, Westenhoefer (1991) argued that eating restraint is not a homogenous construct, and instead divided it into two forms: rigid control and flexible control. *Rigid control* is an all-or-nothing approach to eating—operationalized by behaviors such as actively avoiding and refusing desired calorie-dense foods (and if such foods are consumed, overeating and guilt may follow), regimented calorie counting and dieting to control weight, eating diet foods to avoid weight gain,

73 and skipping meals (Westenhoefer, Stunkard, & Pudel, 1999). In contrast, *flexible control* is
74 generally considered a balanced approach to eating—operationalized by behaviors such as taking
75 smaller than desired servings of food to control weight, being conscious of foods eaten, taking
76 weight into account when making food choices, and engaging in compensation (i.e., intentionally
77 eating less and/or healthier alternatives at the next meal) if too much is eaten (or less healthy
78 options are chosen) at the previous meal (Westenhoefer et al., 1999).

79 Dividing eating restraint into rigid and flexible control holds promise for understanding
80 some of the conflicting data in the restraint field. Research has shown that rigid control and
81 flexible control are related in opposite directions to some health-related and well-being indices in
82 various populations. Specifically, rigid control was positively related to disinhibited eating and
83 body mass index (BMI), whereas flexible control was inversely related to disinhibited eating and
84 BMI among both U.S. and German adult women and men in weight reduction programs (Smith,
85 Williamson, Bray, & Ryan, 1999; Westenhoefer, 1991; Westenhoefer et al., 2013; Westenhoefer,
86 von Falck, Stellfeldt, & Fintelman, 2004), U.S. and German community women and men
87 (Shearin, Russ, Hull, Clarkin, & Smith, 1994; Smith et al., 1999; Westenhoefer et al., 1999), and
88 U.S., U.K., and German college women and men (Timko & Perone, 2005; Westenhoefer,
89 Broeckmann, Münch, & Pudel, 1994; Westenhoefer et al., 2013). Rigid and flexible control were
90 also differentially linked to binge eating and overeating among U.S. and German community
91 adults (Smith et al., 1999, Westenhoefer et al., 1999), with rigid control positively linked and
92 flexible control inversely linked to these behaviors.

93 As a result of their findings, Westenhoefer et al. (1999) have recommended that flexible
94 control strategies be applied in lieu of rigid control strategies to promote health. This
95 recommendation is also consistent with prominent health organizations advocating for the
96 universal adoption of flexible control strategies (e.g., monitoring portion sizes, eating smaller

97 amounts and lower calorie versions of comfort foods, staying within a predetermined daily
98 calorie range, and self-monitoring weight; CDC, 2013).

99 Yet, these recommendations may be ill-advised, as data do not uniformly uphold a
100 positive link between flexible control and health. Some studies have found no association
101 between flexible control and well-being; more specifically, flexible control was unrelated to
102 emotional distress (i.e., anxiety, depression, impulsiveness, and body image disturbance) in U.S.
103 college women and men (Timko & Perone, 2005), eating pathology in U.S. college women
104 (Timko & Perone, 2005), and disinhibited eating and body measurements (i.e., BMI, body fat,
105 waist circumference) in Canadian adult men (Provencher et al., 2003). Yet other studies have
106 found positive associations between flexible control and psychological distress; for instance,
107 flexible control has been positively linked to eating disorder symptomatology in U.S. adult
108 women with personality disorders (Shearin et al., 1994), impaired working memory in U.K.
109 women enrolled in a weight loss program (Westenhoefer et al., 2013), and eating pathology in
110 U.S. college men (Timko & Perone, 2005). Among a large sample of Australian women
111 participating in a 2-year longitudinal study on women's health, flexible control strategies
112 promoted, instead of prevented, weight gain (Williams, Germov, & Young, 2007). For instance,
113 after adjusting for baseline BMI and other confounds, reducing portion sizes was associated with
114 an average weight gain of 1.25kg, and reducing fats and sugars was linked to an average weight
115 gain of 1.21kg over the 2-year period. Williams et al. concluded that "doing nothing" (i.e., not
116 using any weight control strategy) yielded more effective weight maintenance than following
117 flexible control strategies. Collectively, these findings challenge scholars' and public health
118 organizations' universal recommendations to engage in dietary strategies characteristic of
119 flexible control, as these strategies do not consistently promote healthier eating behavior, well-
120 being, and weight maintenance.

121 Furthermore, flexible control has been found to be strongly related to rigid control in a
122 positive direction among U.S. and German college samples ($r = .77$, Timko & Perone, 2005; $r =$
123 $.63$, Westenhoefer et al., 1994), German and U.K. men and women enrolled in weight loss
124 programs ($r = .54$, Westenhoefer, 1991; $r = .47$, Westenhoefer et al., 2013), and U.S. women
125 with personality disorders ($r = .87$, Shearin et al., 1994).¹ These correlations call into question
126 Westenhoefer et al.'s (1999) proposition that flexible control is distinct from rigid control, as
127 their shared variance appears to be substantial. Increasing flexible control strategies in the
128 absence of facilitating rigid control strategies may not be feasible. Therefore, recommendations
129 to increase flexible control may need to be re-evaluated, and other alternatives considered.

130 Intuitive eating may be a viable alternative to dietary restriction strategies such as flexible
131 control. *Intuitive eating* entails eating mainly in response to physiological hunger and satiety
132 cues—those who eat intuitively are attuned to and trust their hunger and satiety signals to guide
133 their eating (Tylka, 2006). If such individuals eat more at one meal, they may naturally eat less at
134 the next meal because they are less hungry; therefore, intuitive eating has been described as a
135 flexible and adaptive eating behavior (Tribole & Resch, 2012). Tribole and Resch assert that
136 individuals who eat intuitively are less likely to be preoccupied with food or dichotomize food as
137 good or bad—instead, they often choose foods for the purposes of satisfaction (i.e., taste), health,
138 energy, stamina, and performance.

139 Evidence upholds intuitive eating's positive links to health and well-being (Van Dyke &
140 Drinkwater, 2013). Among adult women and men from the U.S., France, Germany, and New
141 Zealand, intuitive eating has been found to be (a) inversely related to eating disorder
142 symptomatology, disinhibited eating, BMI, body fat, cardiovascular risk, triglyceride levels,

¹ Westenhoefer et al. (1999) and Smith et al. (1999) did not report a correlation coefficient between rigid and flexible control for their samples of German community women and men and U.S. college students, respectively, but indicated that flexible and rigid control were correlated at $p < .001$.

143 food-related anxiety, thin-ideal internalization, body dissatisfaction, body preoccupation, body
144 shame, self-silencing, and negative affect; and (b) positively related to high density lipoprotein
145 cholesterol, interoceptive sensitivity, enjoyment of food, body appreciation, self-compassion, life
146 satisfaction, positive affect, proactive coping, and self-esteem (Augustus-Horvath & Tylka,
147 2011; Camilleri et al., 2015; Denny, Loth, Eisenberg, & Neumark-Sztainer, 2013; Hawks,
148 Madanat, Hawks, & Harris, 2005; Herbert, Blechert, Hautzinger, Matthias, & Herbert, 2013;
149 Madden, Leong, Gray, & Horvath, 2012; Schoenefeld & Webb, 2013; Shouse & Nilsson, 2011;
150 Smith & Hawks, 2006; Tylka, 2006; Tylka & Wilcox, 2006).

151 Moreover, several studies have examined the impact of intuitive eating interventions on
152 health, BMI, and well-being, with positive results (Schaefer & Magnuson, 2014). An
153 intervention group grounded in intuitive eating and size acceptance was compared against a
154 dieting-based weight loss intervention group which emphasized flexible dietary control
155 strategies; both groups of U.S. adult female chronic dieters received six months of the respective
156 intervention and two follow-up assessments at one year (Bacon et al., 2002) and two years
157 (Bacon, Stern, Van Loan, & Keim, 2005) post-intervention. The group receiving the intuitive
158 eating-based intervention decreased total cholesterol, low-density lipoprotein cholesterol,
159 triglycerides, and systolic blood pressure at the 1- and 2-year follow ups as well as decreased
160 physical hunger, disinhibited eating, bulimic symptomatology, drive for thinness, body
161 dissatisfaction, poor interoceptive awareness, and depression at the 2-year follow-up. Whereas
162 the dieting-based intervention group lost weight and showed initial improvements at the 1-year
163 follow up, only one improvement (i.e., lower disinhibited eating) was sustained at the 2-year
164 follow up. Furthermore, attrition was higher in the dieting group compared to the intuitive
165 eating-based intervention (Bacon et al., 2005). Among U.S. female adult employees (or partners
166 of employees) at a university, a group who received a 10-week intuitive eating intervention

167 reported lower disordered eating and body dissatisfaction and higher body appreciation and
168 mindfulness compared to a wait-list control group at 10-weeks post intervention; in fact, the
169 intuitive eating group was 3.5 times more likely to be asymptomatic for disordered eating than
170 the control group (Bush, Rossy, Mintz, & Schopp, 2014).

171 Conceptually, intuitive eating and flexible control should be distinct constructs. Intuitive
172 eating relies on internal hunger and satiety cues, and compensation occurs naturally (e.g., not
173 being hungry after a large meal; Tribole & Resch, 1995, 2012), whereas flexible control relies on
174 external cues for eating (e.g., portion control, weight, and nutritional information), and
175 compensation is conscious and effortful (Westenhoefer, 1991). Yet, as reviewed above, they are
176 both connected positively to health and well-being for select samples. Moreover, it is plausible
177 that intuitive eating could reflect some form of dietary restraint, as intuitive eaters theoretically
178 refrain from eating when physiological hunger cues are not present. It may not matter
179 empirically, therefore, if an individual uses internal or external cues to “restrain” eating.

180 To date, intuitive eating and flexible dietary control strategies have not been compared to
181 determine if they are qualitatively distinct (i.e., represent different constructs), quantitatively
182 distinct (i.e., represent different levels of the same “restraint” construct), or neither qualitatively
183 nor quantitatively distinct (i.e., represent similar levels of the same construct) within the same
184 sample. These comparisons are necessary to determine whether eating based on internal or
185 external cues is differentially linked to well-being (conceptualized broadly as adjustment and
186 distress), and hence whether we should emphasize intuitive eating, flexible control, both, or
187 neither within public health and clinical interventions.

188 Therefore, in the present study, we investigated the relationships of flexible control and
189 intuitive eating to each other, rigid control, BMI, and several indices of well-being including
190 psychological adjustment and psychological distress to discern their independence as constructs.

191 Life satisfaction, positive affect, and body appreciation were chosen to represent indicators of
192 psychological adjustment due to their consistent links to the affective and cognitive appraisals of
193 general and body-related positive psychological health (Avalos, Tylka, & Wood-Barcalow,
194 2005; Pavot & Diener, 1993). Negative affect, poor interoceptive awareness, binge eating, and
195 food preoccupation were chosen as indicators of psychological distress due to their consistent
196 links with eating disorder pathology and negative emotional states (Dakanalis et al., 2014;
197 Tapper & Pothos, 2010; Tylka & Kroon Van Diest, 2013). We sampled community adult women
198 and men to improve generalizability of findings across age.

199 Specific hypotheses were generated and examined:

200 H1: Intuitive eating would be inversely related to flexible control given their conceptual
201 differences, namely in their approach to self-regulation: intuitive eating relies on internal hunger
202 and satiety cues to self-regulate, whereas flexible control relies on external (e.g., portion size,
203 current weight, calorie consumption) cues to self-regulate.² This finding would yield preliminary
204 evidence that high levels of intuitive eating are not equivalent to high levels of flexible control.

205 Because of the strong positive relationships between flexible and rigid control documented in
206 previous research, we predicted that flexible control's correlation with rigid control would be
207 stronger than its correlation with intuitive eating, which would suggest that flexible control is
208 more conceptually similar to rigid control than it is to intuitive eating.

209 H2a: Intuitive eating would be positively associated with adjustment and inversely associated
210 with distress. Given the mixed findings regarding flexible control's associations with well-being
211 reviewed above, we do not offer a hypothesis for its connection to adjustment and distress. H2b:
212 We predicted that the correlations between intuitive eating and each well-being index would be
213 significantly different from the correlation between flexible control and each well-being index

² This hypothesis was exploratory given that no extant research has compared the two approaches.

214 (e.g., the correlation between intuitive eating and life satisfaction would be significantly different
215 from the correlation between flexible control and life satisfaction). If upheld, these findings
216 would highlight that intuitive eating and flexible control have a different pattern in their
217 connection to well-being, providing further evidence that they are not similar constructs.

218 H3: Intuitive eating would be inversely associated with BMI (given the mixed findings for
219 flexible control, we do not offer a hypothesis for its connection to BMI in the present study). We
220 predicted that the correlation between intuitive eating and BMI would be significantly different
221 from the correlation between flexible control and BMI, further upholding the construct
222 differentiation between intuitive eating and flexible control.

223 H4: Intuitive eating would account for unique variance in each index of psychological well-being
224 and BMI, above and beyond the variance contributed by flexible control, providing evidence that
225 (a) intuitive eating and flexible control are *qualitatively* distinct, and (b) intuitive eating is an
226 important and unique eating-related characteristic of well-being. We further considered the
227 variance in well-being and BMI contributed by rigid control, which helped us also determine
228 flexible control's unique links to well-being and BMI after rigid control's variance is removed.

229 **Method**

230 **Participants**

231 Data from 382 online community participants (192 women and 190 men) from 45 U.S.
232 states were analyzed. Participants' average age was 33.80 ($SD = 11.08$). They identified as White
233 (71.9%), African American (8.4%), Asian (9.2%), Latin American (6.3%), Native American
234 (0.5%) or multiracial (3.6%). Their highest degree was a doctorate (1.0%), masters' (7.6%),
235 bachelor's (31.4%), associate (13.6%), or high school (16.8%) degree; the remaining participants
236 reported some graduate (4.1%) or undergraduate (28.3%) education or did not complete high
237 school (0.3%). Median household income fell in the \$45,000-\$60,000 category. Average body

238 mass, calculated from self-reported height and weight via the formula offered by the CDC
 239 (2010), was 26.82 ($SD = 7.30$) for women and 26.54 ($SD = 5.96$) for men.

240 **Measures**

241 **Intuitive eating.** The 23-item Intuitive Eating Scale-2 (IES-2; Tylka & Kroon Van Diest,
 242 2013) assessed participants' tendency to trust in and eat in response to their internal hunger and
 243 satiety cues, while choosing foods they enjoy and work well with their body (e.g., "I rely on my
 244 hunger signals to tell me when to eat," "I allow myself to eat what food I desire at the moment,"
 245 "I mostly eat foods that give my body energy and stamina"). The items are rated along a 5-point
 246 scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) and averaged, with higher scores
 247 indicating greater intuitive eating. Its second-order factor structure, internal consistency
 248 reliability, 3-week test-retest reliability, construct validity, incremental validity, and discriminant
 249 validity have been upheld in samples of college women and men (Tylka & Kroon Van Diest,
 250 2013). Cronbach's alpha was .90 in the present study.

251 **Flexible control.** We used the 12-item Flexible Control subscale of the Cognitive
 252 Restraint Scale (Westenhoefer et al., 1999) to measure flexible control. Each item (e.g., "If I eat
 253 a little bit more during one meal, I make up for it at the next meal" for more items see Table 3)
 254 receives one point if the participant provides a response indicative of flexible control.³ Points are
 255 summed, and thus total scores range from 0 to 12. Upholding its validity, the Flexible Control
 256 subscale was related to lower self-reported energy intake and greater weight loss among
 257 members engaged in a 1-year weight reduction program (Westenhoefer et al., 1999) and higher
 258 self-regulated eating (i.e., defined by eating "in moderation"; Stotland, 2012). Items on this
 259 measure do not assess disinhibited eating, weight history, and weight fluctuations (Westenhoefer

³ We modified the item, "I pay attention to my figure, but I still enjoy a variety of foods" to "I pay attention to my figure (or body build), but I still enjoy a variety of foods" to make it applicable for both women and men.

260 et al., 1999). Cronbach's alpha was .87 in the present study.

261 **Rigid control.** The 16-item Rigid Control subscale of the Cognitive Restraint Scale
262 (Westenhoefer et al., 1999) was used to estimate rigid control. Each item (e.g., "Sometimes I
263 skip meals to avoid gaining weight," "Without a diet plan I wouldn't know how to control my
264 weight") receives one point if a participant provides a response indicative of rigid control, and
265 points are summed to arrive at a total score ranging from 0 to 16. The Rigid Control subscale
266 was positively correlated with disinhibited eating, BMI, and more frequent and severe binge
267 eating among members engaged in a 1-year weight reduction program, upholding its validity
268 (Westenhoefer et al., 1999). Cronbach's alpha was .85 in the present study.

269 **Life satisfaction.** The 5-item Satisfaction with Life Scale (Diener, Emmons, Larsen, &
270 Griffen, 1985) assessed participants' life satisfaction. The items (e.g., "In most ways my life is
271 close to ideal") are rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly*
272 *agree*) and averaged; higher scores reflect greater life satisfaction. This scale has demonstrated
273 evidence of internal consistency reliability, 2-month test-retest reliability, and construct validity
274 (e.g., via its strong relationships to positive affect and self-esteem) among samples of college
275 students (Diener et al., 1985). Cronbach's alpha was .94 in the present study.

276 **Affect.** The Positive and Negative Affect Schedule-Expanded (Watson, Clark, &
277 Tellegen, 1988) measured participants' levels of positive affect (10-item subscale; e.g.,
278 "inspired," "proud") and negative affect (10-item subscale, e.g., "nervous," "distressed").
279 Participants were asked to rate the degree they experienced each emotion "in general, that is, on
280 the average" along a 5-point scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*).
281 Subscale items are averaged. Higher subscale scores indicate higher levels of positive and
282 negative affect, respectively. Both subscales have garnered evidence of internal consistency
283 reliability, 2-month test-retest reliability and construct validity (e.g., via their correlations with

284 symptoms of depression and anxiety) among college students (Watson et al., 1988). Cronbach's
285 alphas were .91 for the Positive Affect subscale and .92 for the Negative Affect subscale in the
286 present study.

287 **Body appreciation.** The 10-item Body Appreciation Scale-2 (BAS-2; Tylka & Wood-
288 Barcalow, 2015) assessed individuals' acceptance of, favorable opinions toward, and respect for
289 their bodies. Items (e.g., "I respect my body") are rated along a 5-point scale that ranges from 1
290 (*never*) to 5 (*always*) and averaged; higher scores reflect greater body appreciation. The BAS-2's
291 internal consistency reliability, 3-week test-retest reliability, and construct validity (via inverse
292 relationships with body shame and body dissatisfaction) have been supported among college
293 samples (Tylka & Wood-Barcalow, 2015). Cronbach's alpha was .97 in the present study.

294 **Poor interoceptive awareness.** The 10-item Interoceptive Awareness subscale of the
295 Eating Disorder Inventory-2 (Garner, 1991) assessed participants' disconnection to their internal
296 body states, such as emotions, hunger, and satiety. These items are rated along a 6-point scale
297 that ranges from 1 (*never true of me*) to 6 (*always true of me*). Rather than using Garner's
298 original method of truncated scoring in clinical samples, we retained the continuous scoring and
299 averaged these responses. Higher scores reflect poorer interoceptive awareness. This subscale's
300 internal consistency reliability, 3-week test-retest reliability, and construct validity (e.g., via its
301 link to alexithymia) have been upheld in college student samples (Tylka & Subich, 2004; Wear
302 & Pratz, 1987). Cronbach's alpha was .89 in the present study.

303 **Binge eating.** We used the 16-item Binge Eating Scale (Gormally, Black, Daston, &
304 Rardin, 1982) to assess participants' behaviors (e.g., eating large amounts of food), emotions
305 (e.g., guilt after overeating), and cognitions (e.g., perceived lack of control when eating)
306 associated with binge eating. Each item ranges in severity from 0 to 3, with higher levels
307 indicating more severe binge eating symptoms. Item scores are summed. Its internal consistency

308 and construct validity (e.g., via correlations with other measures of binge eating) have been
309 upheld in adult samples (Gormally et al., 1982; Marcus, Wing, & Hopkins, 1988; Telch & Agras,
310 1994). Cronbach's alpha was .93 in the present study.

311 **Food preoccupation.** The 3-item Frequency subscale of the Food Preoccupation
312 Questionnaire (Tapper & Pothos, 2010) was used to assess the extent participants thought about
313 food. These items (e.g., "I often find myself thinking about food") are rated along a 5-point scale
314 ranging from 1 (*completely disagree*) to 5 (*completely agree*) and averaged. Higher scores reflect
315 greater food preoccupation. The internal consistency reliability, 1-week test-retest reliability, and
316 construct validity (via links to food cravings and binge eating) for this subscale were supported
317 among college students (Tapper & Pothos, 2010). Cronbach's alpha was .93 in the present study.

318 **Procedure**

319 After IRB approval was granted from a large university in the Midwestern United States,
320 data were collected from adult community members on Amazon Mechanical Turk (MTurk).
321 Increasingly used in psychological research, MTurk is an online website whereby participants
322 receive monetary compensation for completing work-related tasks, referred to as "hits," which
323 can include completing surveys. Data gathered from MTurk are more diverse and nationally
324 representative, but just as psychometrically sound, when compared to data gathered from college
325 student samples (Buhrmester, Kwang, & Gosling, 2011).

326 This study was described to potential participants on the MTurk worker hit website as "an
327 investigation of eating behaviors and personality." Access was restricted to U.S. citizens who
328 completed ≥ 100 hits and had an average $\geq 98\%$ acceptance rating, which is based on other
329 experimenters' approval of their prior work. The latter two restrictions ensured that participants
330 were experienced users of MTurk and increased the likelihood that they would be conscientious
331 when taking our survey. Restricting the survey to U.S. citizens ensured that geographical

356 flexible control and (b) their degree of conceptual overlap was not large. Conversely, there was a
357 great deal of conceptual overlap between flexible and rigid control, which were positively
358 correlated (i.e., $r^2 = 50.4\%$ for women and 51.8% for men). A Fisher's r to z correlational
359 comparison, which examines the significance of the difference between two correlation
360 coefficients, revealed that flexible control was more closely related (i.e., conceptually similar) to
361 rigid control than intuitive eating, $z = 18.28$, $p < .001$.

362 Furthermore, intuitive eating and flexible control were differentially related to the indices
363 of well-being (see Table 1). Intuitive eating was positively related to psychological adjustment
364 (life satisfaction, positive affect, and body appreciation) and inversely related to psychological
365 distress (negative affect, poor interoceptive awareness, binge eating, and food preoccupation) for
366 both women and men, thus upholding H2a. In contrast, flexible control was unrelated to
367 psychological adjustment and distress, except for its rather small positive correlations with poor
368 interoceptive awareness and binge eating for men, and food preoccupation for women and men.

369 Fisher's r to z correlational comparisons determined whether the correlations between
370 intuitive eating and each well-being index were significantly different from the correlations
371 between flexible control and each well-being index—for example, the intuitive eating and life
372 satisfaction correlation was compared to the flexible control and life satisfaction correlation.
373 Because the pattern of correlations was generally similar between women and men (Table 1), we
374 combined women and men and set the p -value at $.007$ ($.05/7$) to control for the seven
375 comparisons. These correlational comparisons were significantly different for life satisfaction (z
376 $= 4.78$), negative affect ($z = -4.98$), body appreciation ($z = 9.86$), poor interoceptive awareness (z
377 $= -10.67$), binge eating ($z = -12.79$), and food preoccupation ($z = -11.88$; all $ps < .001$), but
378 similar for positive affect ($z = 2.07$, $p = .019$). Thus, these findings largely support H2b and,
379 collectively, provide evidence that intuitive eating and flexible control have a different pattern in

380 their connection to well-being, providing further evidence that they are quantitatively dissimilar.

381 Intuitive eating was inversely associated with BMI to a moderate degree for women and
382 men. Flexible control, however, was not related to BMI for women or men. Indeed, Fisher's r to
383 z correlational comparisons revealed that intuitive eating and flexible control were differentially
384 associated with BMI for women ($z = -4.45, p < .001$) and men ($z = -4.37, p < .001$). These
385 findings uphold H3, in that intuitive eating's connection to BMI is different than flexible
386 control's connection to BMI.

387 Next, we conducted a set of hierarchical regressions to determine whether intuitive eating
388 accounted for unique variance in each well-being index and BMI above and beyond the variance
389 contributed by flexible control (see Table 2). Also, given the large positive correlation found
390 between flexible and rigid control, we examined whether flexible control was associated with
391 these criteria once its shared overlap with rigid control was excluded. Therefore, for each
392 regression, rigid control was entered at Step 1, flexible control at Step 2, and intuitive eating at
393 Step 3, in the prediction of each well-being index and BMI. Because of the similar correlational
394 values between women and men (Table 1), we combined their data in the analyses and adjusted
395 the p -level to .006 (.05/8) to control for Type I error. At each step, tolerance and variance
396 inflation factor (VIF) values were acceptable (i.e., tolerance = .486, .640, and .610; VIF = 2.06,
397 1.56, and 1.63, for each step, respectively), indicating that multicollinearity was not an issue, and
398 the individual predictors could be interpreted with confidence (Allison, 1998).

399 These regressions revealed that intuitive eating predicted unique variance (i.e., range
400 5.5% - 17.7%) in each psychological well-being index and BMI above and beyond flexible and
401 rigid control (see Table 2). Therefore, in support of H4, intuitive eating is qualitatively different
402 from flexible control (i.e., they are not simply different levels of the same restraint construct),
403 demonstrating that intuitive eating is both an important and unique eating-related characteristic

404 of well-being and is uniquely associated with lower BMI.

405 Furthermore, in these regressions, we noted that flexible control was positively associated
406 with the indices of adjustment, with the exception of life satisfaction, and inversely associated
407 with the indices of psychological distress and BMI (see Table 2). These findings stand in contrast
408 to the bivariate correlations which demonstrated that flexible control was unrelated to
409 psychological well-being and BMI (see Table 1). The difference between these analyses was
410 that, in the regressions, the variance flexible control shared with rigid control was excluded from
411 consideration. Therefore, flexible control was positively related to most indices of adjustment
412 and negatively related to psychological distress and BMI *only* when flexible control's sizeable
413 conceptual overlap ($r^2 > 50\%$) with rigid control was removed.

414 These latter findings prompted us to question whether certain flexible control items are
415 related in an adaptive direction to well-being or negatively linked to BMI without being linked to
416 rigid control—if so, these items may reveal positive aspects of flexible control that are
417 uncontaminated by rigid control. Thus, we performed a post-hoc canonical correlation analysis to
418 explore the multivariate shared variance between the 12 flexible control items (the first variable
419 set) and the seven well-being indices, BMI, and rigid control (the second variable set). The
420 overall model was significant, Wilks' $\lambda = .249$. As illustrated in Table 3, two pairs of canonical
421 variates accounted for the significant relationships between the two variable sets, and together
422 accounted for 88.33% of the total variance. With an interpretive cutoff correlation of $|\cdot45|$
423 (Sherry & Henson, 2005), correlations with the first canonical variate indicated that participants
424 reporting higher rigid control also reported higher flexible control on all items except Item 9 (“I
425 pay attention to my figure [or body build], but I still enjoy a variety of foods”). After removing
426 the shared variance from the first canonical variate, the second canonical variate revealed that
427 higher positive affect and body appreciation, as well as lower food preoccupation, binge eating,

428 and BMI, were related to higher levels of flexible control Items 1 (“When I have eaten my quota
429 of calories, I am usually good about not eating any more”), 9 (“I pay attention to my figure [or
430 body build], but I still enjoy a variety of foods”), and 10 (“I prefer light foods that are not
431 fattening”). Therefore, Item 9 was the only flexible control item that did not share substantial
432 variance with rigid control *and* was associated positively with body appreciation and inversely
433 with binge eating, food preoccupation, and BMI.

434 **Discussion**

435 Intuitive eating and flexible control have been touted by scholars as adaptive approaches
436 to eating that stand in contrast to rigid restriction of food intake (Tribole & Resch, 2012; Tylka &
437 Kroon Van Diest, 2013; Westenhoefer et al., 1999). Seemingly similar in some behaviors (e.g.,
438 eating less to compensate for a large meal), yet theoretically different (e.g., following internal
439 versus external cues to eating), intuitive eating and flexible control have never been positioned
440 together in the same study to determine their unique contributions to well-being. In this study,
441 we compared intuitive eating with flexible control to determine whether they are qualitatively
442 distinct (i.e., represent different constructs), quantitatively distinct but qualitatively similar (i.e.,
443 represent different levels along a restraint continuum), or neither qualitatively nor quantitatively
444 distinct (i.e., represent similar levels of the same construct). Two main conclusions emerged.

445 First, intuitive eating is not the same as flexible control. These constructs are qualitatively
446 distinct and independent. Largely, this conclusion was derived from our finding that intuitive
447 eating contributed unique variance to eight indices of well-being (psychological distress and
448 adjustment) and BMI, above and beyond the variance contributed by flexible control. Additional
449 analyses excluded other possibilities, such as that intuitive eating and flexible control are mirror
450 constructs or that they represent different levels of the same underlying construct. Because they
451 are inversely related, and the degree of conceptual overlap between intuitive eating and flexible

452 control (via their correlations with one another) was quite low for both women (7%) and men
453 (11.7%), we conclude that intuitive eating and flexible control are not conceptually the same
454 construct. Also, because intuitive eating and flexible control were significantly different from
455 one another in their bivariate associations with six of the seven well-being indices and BMI, we
456 are confident that intuitive eating and flexible control do not simply represent different levels of
457 the same construct.

458 Second, flexible control was intertwined with rigid control at both the scale and item
459 levels. At the scale level, our analyses demonstrated that flexible and rigid control were
460 positively related and shared a substantial percentage of variance (i.e., slightly over 50%), which
461 was unsurprising due to the strong positive correlation between flexible and rigid control
462 documented in some previous studies (Timko & Perone, 2005; Westenhoefer, 1991;
463 Westenhoefer et al., 1994, 2013). Our findings further revealed that this strong positive
464 relationship suppressed flexible control's associations with well-being. Flexible control was
465 unrelated with psychological well-being and BMI within bivariate correlations. When its shared
466 variance with rigid control was removed in the multiple regression analyses, however, flexible
467 control was positively related to most indices of adjustment and negatively related to
468 psychological distress and BMI. Thus, researchers would need to remove flexible control's
469 shared variance with rigid control in order to be able to assess an adaptive version of flexible
470 control. At the item level, a canonical correlation analysis revealed that 11 of the 12 flexible
471 control items were positively related to rigid control. After excluding the items' shared variance
472 with rigid control, three flexible control items were associated positively with body appreciation
473 and inversely with binge eating, food preoccupation, and BMI. Of these three, only "I pay
474 attention to my figure [or body build], but I still enjoy a variety of foods" was not substantially
475 linked to rigid control, suggesting that it may tap into an adaptive version of flexible control by

476 itself.

477 Our findings therefore call into question the clarity and utility of flexible control. The
478 adaptive properties of flexible control are not revealed unless researchers remove its shared
479 variance with rigid control. It would be impractical for researchers to assess adaptive flexible
480 control by measuring both flexible and rigid control and excluding the variance contributed by
481 rigid control. Even if researchers proceeded to assess adaptive flexible control in this manner, it
482 is not clear what adaptive flexible control *is* in the absence of rigid control, as both are
483 intertwined within 11 of the 12 flexible control items. We can look to the one item unrelated to
484 rigid control for guidance on defining adaptive flexible control; however, this single item would
485 likely not yield a comprehensive understanding of adaptive flexible control as a construct. For
486 the study of adaptive flexible control to continue, researchers need to explore a different
487 operationalization of this construct—one that emphasizes external self-regulation yet does not
488 overlap conceptually or empirically (via shared variance) with rigid control and is linked to
489 indices of well-being and health in a beneficial direction. We are uncertain if such an
490 operationalization is feasible. Indeed, it seems to be the exertion of external control over eating
491 that underlies rigid and flexible control patterns of eating, and distinguishes them from intuitive
492 eating. Whether or not this “control” can ever be adaptive in the context of eating behavior
493 remains an open question.

494 It is likely that the flexible control strategies advocated by some professionals and health
495 organizations inadvertently emphasize rigid control, as these strategies are similar to the item
496 content of Westenhoefer et al.’s (1999) Flexible Control subscale. As such, we discourage
497 professionals and health organizations from advocating that community adults adopt flexible
498 control strategies to promote health and well-being, as Westenhoefer et al. (1999) has
499 recommended. Our data suggest that this recommendation may be impractical and potentially

500 harmful: if professionals and health organizations follow this recommendation and utilize the
501 operationalization of flexible control proposed by Westenhoefer et al. (1999), they may be
502 inadvertently promoting rigid control as well.

503 In contrast to flexible control, intuitive eating appears to be an adaptive and stand-alone
504 construct useful for researchers and clinicians. Researchers do not need to extract intuitive
505 eating's shared variance with rigid and/or flexible control (or any other variable) for intuitive
506 eating to be positively associated with psychological adjustment and inversely associated with
507 psychological distress and BMI. The measures of intuitive eating available—the original IES and
508 the newer IES-2—yield reliable and valid scores for women and men, and their items clearly and
509 comprehensively represent the intuitive eating construct (Tylka, 2006; Tylka & Kroon Van
510 Diest, 2013), which is a benefit to researchers. Instead of being strongly related to higher levels
511 of rigid control (like flexible control), intuitive eating is more moderately related to lower levels
512 of rigid control. Thus, it is highly unlikely that promoting intuitive eating will promote rigid
513 control. Indeed, Bacon et al. (2005) found that their Health at Every Size® intuitive eating
514 intervention group significantly lowered participants' eating restraint from baseline to post-
515 treatment, and sustained this change at a 2-year follow-up. Bush et al. (2014) found that their
516 intuitive eating intervention group was 3.5 times more likely to be asymptomatic for disordered
517 eating than a wait-list control group at 10-weeks post intervention. Hence, intuitive eating
518 interventions are not likely to promote eating pathology and may even lessen it (Schaefer &
519 Magnuson, 2014; Tylka et al., 2014).

520 It is important to acknowledge the present study's limitations, which reveal avenues for
521 future research. We used a cross-sectional, correlational design which precludes conclusions
522 regarding causal direction. From our data, we cannot argue that intuitive eating increases
523 psychological adjustment or decreases psychological distress and BMI—we can only conclude

524 that intuitive eating is related to well-being in an adaptive fashion as well as related to lower
525 BMI. Perhaps psychological well-being promotes attention to and trust in internal bodily signals,
526 which facilitates intuitive eating, rather than the opposite direction. Longitudinal studies are
527 needed to examine intuitive eating and well-being patterns across time.

528 Participants self-selected to complete this study, which may have led to biases in the
529 sample, such that only U.S. citizens with access to the Internet and both interested in and curious
530 about eating habits provided their responses. Although our sample was more diverse than the
531 typical U.S. college student female sample, there is still a need to examine whether our findings
532 are generalizable across participants of various social and cultural identities, many of which may
533 not have easy access to the Internet. Furthermore, we relied upon self-report data, and thus it is
534 possible that participants did not accurately report their responses. The anonymous nature of the
535 survey may have minimized overt misreporting.

536 **Conclusions**

537 The present study garnered considerable support for intuitive eating as an adaptive and
538 distinct construct from flexible control among community women and men. Conversely, the
539 present study did not support flexible control's conceptual independence from rigid control, and
540 this overlap with rigid control clouded our understanding of flexible control as a construct and
541 confounded its associations with well-being. Importantly, intuitive eating does not appear to be
542 another variety or form of restraint. Collectively, our findings caution against promoting flexible
543 control (as it is currently operationalized and assessed) within clinical and public health contexts
544 while further substantiating efforts to promote intuitive eating among adults within these
545 contexts.

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