

EFFICACY OF AN INTEGRATED PREVENTION PROGRAM FOR EATING DISORDERS AND OBESITY (PIA-2) IN FEMALE ADOLESCENTS FROM ARGENTINA

Guillermina Rutzstein¹, M. Luz Scappatura¹, Luciana Elizathe¹, Eduardo Leonardell^{1,2,3}, Brenda Murawski¹, Leonora Lievendag¹, Julieta Sanday¹, M. Belén Banasco Falivelli¹, Germán Bidacovich¹, Eduardo Keegan¹

¹ Universidad de Buenos Aires, Facultad de Psicología

² Pontificia Universidad Católica Argentina

³ Universidad Favaloro

E-mail: guillermina.rutzstein@gmail.com, luzscappatura@hotmail.com, lucianaeli@hotmail.com, eleonard000@gmail.com, brendamsk@hotmail.com, leolievendag@gmail.com, juli_sanday@hotmail.com, mariabelenbanasco@live.com, bidacovichgerman@gmail.com, ekeegan@psi.uba.ar

ORCID: 0000-0002-2237-4738, 0000-0002-9729-5655, 0000-0003-3181-3461, 0000-0002-3607-076X, 0000-0001-6199-2558, 0000-0002-9115-0041, 0000-0002-8318-8234

AUTHOR CONTRIBUTIONS STATEMENT

Conceptualization: Guillermina Rutzstein, M. Luz Scappatura, Luciana Elizathe, Brenda Murawski

Funding acquisition: Guillermina Rutzstein, Leonora Lievendag

Data curation: Brenda Murawski

Formal analysis: M. Luz Scappatura, Eduardo Leonardelli

Investigation: Guillermina Rutzstein, M. Luz Scappatura, Luciana Elizathe, Brenda Murawski, Leonora Lievendag, Julieta Sanday, M. Belén Banasco Falivelli and Germán Bidacovich

Methodology: Guillermina Rutzstein, Eduardo Leonardelli, Brenda Murawski

Project administration: Guillermina Rutzstein

Resources: Guillermina Rutzstein, Julieta Sanday, M. Belén Banasco Falivelli and Germán Bidacovich

Supervision: Guillermina Rutzstein and Eduardo Keegan

Validation: Eduardo Leonardelli

Visualization: Brenda Murawski

Writing—original draft: Guillermina Rutzstein, M. Luz Scappatura, Luciana Elizathe, Eduardo Leonardelli, Brenda Murawski, Leonora Lievendag, Julieta Sanday, M. Belén Banasco Falivelli, Germán Bidacovich and Eduardo Keegan

Writing—review and editing: Guillermina Rutzstein, M. Luz Scappatura, Luciana Elizathe, Brenda Murawski, Leonora Lievendag and Eduardo Keegan

CORRESPONDENCE TO: Guillermina Rutzstein. Bulnes 2591 (C1425DKS), Buenos Aires – Argentina. E-mail: guillermina.rutzstein@gmail.com

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Abstract

Objective: The study aimed to examine the efficacy of an integrated prevention program for eating disorders and obesity (PIA-2) in female adolescents from Argentina by comparing an experimental group versus a control group.

Method: The final sample included 509 girls between 13-18 years old ($M = 15.39$ and $SD = 1.30$) who completed data for three assessment time points: baseline, post-intervention and a 3-month follow-up. The evaluated dependent variables were skipping breakfast, physical activity, eating disorder risk and thin ideal internalization. The program was carried out in three 90-minute sessions within usual school hours, at 1-week intervals.

Results: A significant intervention effect was observed in skipping breakfast. Participants who received the intervention decreased more than the control group in skipping breakfast month by month. A significant effect of the intervention was not found on physical activity, eating disorder risk and thin ideal internalization.

Discussion: The presence of mixed findings shows the need to adjust the intervention to enhance the results. The importance of working jointly with other Latin American countries is emphasized, in order to promote the growth of the field of prevention, regarding cultural particularities shared by our societies.

Keywords: Prevention - Eating Disorders – Obesity - Efficacy - Latin America – Argentina -Adolescents

PUBLIC SIGNIFICANCE STATEMENT

Integrated prevention programs are necessary to address the entire spectrum of problems related to weight, diet and body image. However, their development is still incipient in Latin America. PIA-2 Program, designed for female adolescents produced positive results in one of the four variables studied, decreasing the weekly frequency of skipping breakfast among adolescents. This is pioneering research in Argentina and the region since very few studies on integrated prevention have been published in Latin America. It is crucial to continue with efforts aimed at developing programs that are suited to the specific needs of the population of Latin American countries. In this aspect, our study is undoubtedly an important contribution.

EFFICACY OF AN INTEGRATED PREVENTION PROGRAM FOR EATING DISORDERS AND OBESITY (PIA-2) IN FEMALE ADOLESCENTS FROM ARGENTINA

Introduction

Female adolescents are a risk group for the development of problems related to eating, weight and body image (Izydorczyk & Sitnik-Warchulska, 2018). In the transition from childhood to adolescence, the changes due to puberty are often associated with an increase in body dissatisfaction in a sociocultural context that exalts thinness (Bakalar et al., 2015; Uchoa et al., 2019). Diets and the beginning of dysfunctional behaviors oriented to losing weight are also frequent in this stage (Neumark-Sztainer et al., 2006). These behaviors represent a risk for the development of eating disorders (EDs), clinical problems characterized by an elevated morbidity and a negative impact on quality of living (Van Hoeken & Hoek, 2020). Also, restrictive dieting has been found to trigger binges and weight-related alterations (e.g., obesity) (Burton & Abbott, 2019; Micali et al., 2014). Several studies have pointed out that for children and adolescents with overweight or obesity, weight stigma is widespread and is primarily expressed as weight-based teasing and bullying (Pont et al., 2015; Puhl & Suh, 2015). This stigma contributes to behaviors such as binge eating, social isolation, decreased physical activity, and increased weight gain over time, which worsen quality of life (Goldfield et al., 2010; Puhl et al., 2011; Slater & Tiggeman, 2011). Additionally, the specialized treatment of problems related to eating, weight and body image is, in many cases, not accessible, and relapses are common (Cooper & Bailey-Straebl, 2015). Hence, prevention in this area is of paramount importance.

In addition to the traditional programs for the prevention of EDs and obesity as separate interventions, integrated approaches have been developed in recent years (Kass et al., 2017; Sánchez-Carracedo et al., 2012). This kind of intervention is based on the premise that EDs and obesity may be considered as part of the same spectrum of eating, weight and body image disorders (Austin, 2011; Neumark-Sztainer, 2005; Sánchez-Carracedo et al., 2013). Obesity and EDs tend to have a simultaneous onset or migrate from one to the other (Custodio et al., 2017; Day et al., 2009), and they share risk factors, such as restrictive diets, dysfunctional weight-control behaviors, and high thin-ideal internalization (Day et al., 2009; Ferrari, 2015; Haines & Neumark-Sztainer, 2006; Rancourt & McCullough, 2015; Sánchez-Carracedo et al., 2013; Stice et al., 2005; Wilksch et al., 2014). Therefore, integrated prevention interventions offer a more efficient alternative, reducing the costs of providing two separate programs. Also, it has the advantage of avoiding contradictory

34 messages that might confuse those participating in a program solely focused on EDs or on obesity
35 (Irving & Neumark-Sztainer, 2002). For example, it has been suggested that an integrated
36 prevention would avoid the iatrogenic effects produced by some obesity prevention programs that,
37 by focusing on losing weight, provoke the increase of body dissatisfaction and dysfunctional weight-
38 control behaviors, which increases the chance of triggering an ED in vulnerable people (O'Dea, 2005;
39 Pinhas & Taylor, 2012). With respect to goals, most integrated programs focus on the reduction of
40 risk factors shared by both disorders and are oriented to the promotion of healthy eating habits and
41 physical activity (Neumark-Sztainer, 2009). Moreover, these programs promote a positive body
42 image, as well as the acceptance of body diversity, fighting the obesity stigma (Sánchez-Carracedo
43 et al., 2012).

44 One of the programs that pioneered integrated prevention was *Healthy Buddies* (Stock et al.,
45 2007), designed for males and females. Results show an increase in healthy-living knowledge,
46 behavior, and attitude scores. Further studies implementing the same program confirmed these
47 findings (Campbell et al., 2012). Also, López-Guimerà et al. (2011) developed the *MABIC* Program
48 for female adolescents. Results show that, compared to the control group, teenagers that
49 completed the program showed a greater reduction of thin-ideal internalization, dysfunctional
50 eating attitudes, and weight-related teasing between pretest and follow up (Sánchez Carracedo et
51 al., 2016). However, no effects were found for other variables, such as body image dissatisfaction
52 and drive for thinness. Finally, *Healthy Body Image* (Sundgot-Borgen et al., 2019) has been recently
53 developed. The results of this program showed favorable changes in body image and health-related
54 quality of living in female participants.

55 In Latin America, research on integrated prevention is in its early stages, and efficacy studies
56 are very scarce. In Mexico, Castillo et al. (2016) developed and implemented the *StopOBEyTA*
57 program, resulting in a reduction of the thin-ideal internalization and of dysfunctional eating
58 behaviors in women, although the effect size was small. In Brazil, the Australian program *Healthy*
59 *Habits, Healthy Girls* (Leme & Philippi, 2015) was adapted and assessed, with good results found at
60 six months follow-up on perceived social support for physical activity and the implementation of
61 healthy eating strategies. However, participants increased dysfunctional weight-control behaviors
62 (Leme et al., 2019).

63 In Argentina, the *PIA-2 Program* was developed (Rutzstein et al., 2022), based on cognitive
64 dissonance theory and on the media literacy educational approach, the models with the highest
65 efficacy for universal-selective populations (Watson, 2016; Stice et al., 2019). Cognitive dissonance
66 theory posits that when we perceive an inconsistency between our beliefs and behaviors, a tension

67 is generated that motivates change aimed at reducing such inconsistency (Festinger, 1957). As for
68 media literacy, it is an educational approach that aims at training individuals to think critically about
69 the messages broadcasted by mass-media and, consequently, to reduce their credibility and
70 influence on the body ideal (Jeong et al., 2012). *PIA-2 Program* approaches topics related to the
71 whole spectrum of eating, weight and body image problems in female adolescents. The goal of this
72 intervention is to reduce shared risk factors, with thin-ideal internalization being the one with the
73 greatest empirical support (Haines et al., 2007; Neumark-Sztainer et al., 2006; Smolak & Chun-
74 Kennedy, 2015). Also, *PIA-2 Program* seeks to promote healthy eating habits and to reduce
75 restrictive dieting, specially skipping breakfast, which is a problem in Argentina, with four out of ten
76 children in school not having breakfast (Britos, 2014). Physical activity is also promoted, with a focus
77 on wellbeing and body functionality. Fostering healthy, sustainable eating habits and physical
78 activity has shown to be key in the prevention of eating, weight and body image-related problems
79 (Golden et al., 2016; Stice et al., 2018).

80 Although there has been an advance in the development and assessment of integrated
81 prevention programs in the recent decade, the efficacy of these interventions is still limited (Le et.
82 al, 2017), and few studies have been conducted in Latin America. Therefore, the present study has
83 the goal of evaluating the efficacy of the *PIA-2 Program* among female students from Argentina.
84 Results will contribute to the field of preventing problems related to the spectrum of eating, weight
85 and body image disorders. We hypothesize that participants of *PIA-2 Program*, compared to
86 adolescents in the control group, will show a decrease in skipping breakfast, thin-ideal
87 internalization, risk for ED, and an increase in the frequency of physical activity.

88

89 **Method**

90

91 ***Participants***

92

93 Spanish-speaking female students from Argentina aged 13–18 years were recruited. The non-
94 probability sample included 509 adolescents (98.1% of the original sample with parents' consent)
95 (Figure 1). The inclusion criteria were being female, 13-18 years old, having parents' written
96 informed consent, and accepting to participate. An exclusion criterion was reading comprehension
97 problems reported by the school.

98

99 (INSERT FIGURE 1)

100 The mean age was 15.39 years ($SD = 1.30$) at baseline. The participants' average self-reported
101 body mass index ($BMI=kg/m^2$) was $22.70 kg/m^2$ ($SD = 4.37$). In the distribution of age-adjusted BMI
102 function (World Health Organization, 2007), 8.8% of the sample presented low weight, 59.4%
103 normal weight and 31.8% overweight or obesity.

104

105 ***Procedure and study design***

106

107 This was an experimental study that analyzed the impact of *PIA-2* (Rutzstein et al., 2022) in
108 female adolescents comparing an experimental group versus a control group. The assessment was
109 performed at three time points: baseline (month 0), post-intervention (month 1) and 3-month
110 follow up (month 4).

111 This study was approved by the Ethics Committee of the Universidad de Buenos Aires.
112 According to current ethical principles for human research, adolescents and parents provided
113 written assent and consent, and were informed about the confidentiality of provided data and about
114 the voluntary nature of their participation (World Medical Association Declaration of Helsinki,
115 2013).

116 The intervention was school based. Secondary schools from three cities placed in the north,
117 central, and south regions of Argentina were invited to participate. In total, nine schools agreed to
118 participate, and were randomly assigned to the experimental or the control group, with the goal of
119 controlling for the potential contamination effect that might occur if students from both groups
120 attended the same school (Becker et al., 2003). The students in the experimental group attended
121 the sessions of *PIA-2* in their regular school hours, while students in the control group continued
122 with their usual schedule. Students in the control group received the intervention once the
123 assessment process of the experimental group was completed. The program included three 90-
124 minute sessions delivered at weekly intervals. The intervention was administered by two clinical
125 psychologists, in groups of 15-20 participants, and following a manualized intervention (Rutzstein
126 et al., 2022). Participants were recruited from 2018 to 2021. In 2020, the study was interrupted due
127 to the COVID-19 pandemic and social isolation measures.

128

129 ***Measures***

130

131 Participants completed the following self-administered instruments in a hard-copy paper
132 format:

133 *Sociodemographic and eating habits/physical activity data sheet.* It was used to collect
134 background data on current age, weight, height and education level. BMI was calculated. The
135 questionnaire also included two questions: 1. *How many days a week do you have breakfast?* 2.
136 *How many days a week do you practice physical activity (like walking, biking, sports, dancing apart*
137 *from mandatory classes at school).*

138 *Eating Disorder Inventory-3 - Eating Disorder Risk Index (EDI-3-RF)* (Garner, 2004; Argentinian
139 adaptation: Rutzstein et al., 2013). The Index includes 25 items rated on a 6-point Likert scale that
140 assess attitudes and behaviors related to eating, weight and body image. In the present study,
141 Cronbach's alpha of the Eating Disorder Risk Index varied by group across the three time points
142 ($\alpha=.90$, $\alpha=.90$, $\alpha=.90$ for intervention and $\alpha=.87$, $\alpha=.88$, $\alpha=.88$ for control).

143 *Sociocultural Attitudes Towards Appearance Questionnaire-4 – Thin-ideal Internalization*
144 *Subscale (SATAQ-4; Schaefer et al., 2015; Spanish version: Llorente et al., 2015).* The subscale is
145 composed by 5 items that measure the degree in which a person has internalized the thin-ideal.
146 Items are responded through a 5-option Likert scale. The Spanish version (Llorente et al., 2015) has
147 shown evidence of convergent and concurrent validity. In the present study, Cronbach's alpha
148 varied by group across the three time points ($\alpha=.79$, $\alpha=.81$, $\alpha=.82$ for intervention and $\alpha=.82$, α
149 $=.84$, $\alpha=.86$ for control).

150

151

152 ***The intervention: PIA-2***

153

154 *Program PIA-2's* goals involve generating cognitive dissonance about the thin- ideal,
155 promoting a critical analysis of the messages broadcasted by mass-media, and fostering healthy
156 eating habits and physical activity. The approach is interactive, and the active participation of
157 adolescents is promoted through activities, videos and games with attractive and entertaining
158 content.

159 Each of the three sessions includes three thematic modules: 1) Body image 2) Healthy eating,
160 and 3) Movement/Physical activity. Also, homework between sessions is included in order to
161 strengthen and give continuity to the topics discussed in the program (see Table 1).

162

163 (INSERT TABLE 1)

164

165 ***Data Analysis***

166

167 Multilevel linear models (MLM) were used to test the main hypotheses of this study, since data have
168 a nested structure. MLMs deal with dependency of data due to repeated measures and provide a
169 robust strategy to handle missing data (Gómez Penedo et al., 2019; Raudenbush & Bryk, 2002). In
170 this study, repeated measures of four dependent variables (skipping breakfast, physical activity,
171 eating disorder risk and thin ideal internalization) are nested in students that are nested within
172 schools (3-level model structure). Intraclass correlation coefficients (ICC) were calculated in order
173 to assess whether each level of structure had a significant effect on the dependent variables and
174 had to be incorporated into the models. The explained variance by the third level (school) was
175 divided by the sum of variance of first level (repeated measures), second level (students), and third
176 level (Raudenbush & Bryk, 2002). Following previous recommendations, the third level (school) was
177 maintained if the explained variance was greater than 1% (i.e., $ICC > 0.01$; see e.g. Westra et al.,
178 2016). Three-level fully unconditional models and three-level time-as-only predictor models (TAOP)
179 were run to estimate change over time for three of the dependent variables (physical activity, eating
180 disorder risk and thin ideal internalization). For skipping breakfast instead, a two-level fully
181 unconditional model and a two-level TAOP model were run. In the fully unconditional models, we
182 did not include any predictor to explain variance of dependent variables. In TAOP models, only the
183 temporal variable was included as a predictor. The temporal variable was defined in months and
184 centered at the end of follow-up.

185 Finally, to test the effect of the intervention, for physical activity, eating disorder risk and thin ideal
186 internalization, three-level conditional models were run including intervention (coded as Control =
187 0, Intervention = 1) as a predictor of both: the intercept and the time effect. For skipping breakfast,
188 we ran a two-level conditional model. In all cases, we ran fixed and random effects models for the
189 time effect and selected the one that better fit the data. The model's comparisons were made using
190 Chi square difference tests (see tables 4-7). For final models, standardized coefficients are reported
191 as an effect size measure.

192 MLMs were performed using *lme4* (Bates et al., 2015) and *lmerTest* packages (Kuznetsova et al.,
193 2017) of R statistical environment (version 4.1.2). The initial equivalence in age and BMI of the
194 experimental group and the control group was tested with the t-test and the Mann-Whitney U-test
195 of the SPSS-24 program.

196

197 **Results**

198

199 Mean age and BMI comparisons between groups at baseline are shown in Table 2. There were
200 significant differences in age, so correlations with dependent variables were calculated. Significant

201 associations were not found (skipping breakfast, $r = -0.01$, $p = .753$, physical activity, $r = 0.02$, $p =$
202 $.628$, ED risk, $r = 0.02$, $p = .700$, thin-ideal internalization, $r = 0.04$, $p = .418$). Given that in this sample
203 age is not associated with the main variables, we believe that such difference between groups will
204 not affect results. Significant differences were not found in BMI.

205

206 (INSERT TABLE 2)

207

208 Comparisons of dependents variables' means at baseline are shown in Table 3

209 (INSERT TABLE 3)

210

211 ***Skipping breakfast***

212

213 The results of all the models conducted for this dependent variable are shown in Table 4. The
214 inclusion of the temporal variable did not improve the model's fit, compared to the fully
215 unconditional model, $\chi^2(1) = 0.60$, $p = .44$. The unconditional TAOP model showed that there was
216 not a significant effect of time on skipping breakfast, $\gamma_{10} = 0.02$, $SE = 0.02$, $CI_{95}[-0.03, 0.6]$, $t(891) =$
217 0.78 , $p = .44$. The inclusion of intervention as a predictor improved the model's fit compared to the
218 model with time as the only predictor, $\chi^2(2) = 18.26$, $p < .001$. When running a conditional model
219 with time as a random effect, convergence problems were found, so the model that included time
220 as a fixed effect was kept. The conditional model showed a significant intervention effect in the
221 change produced in skipping breakfast, $\gamma_{11} = -0.18$, $SE = 0.05$, $CI_{95}[-0.27, -0.08]$, $t(891) = -3.76$, $p <$
222 $.001$. The standardized coefficients showed that participants who received the intervention
223 decreased 0.07 *SD* more than the control group in skipping breakfast month by month.

224

225 (INSERT TABLE 4)

226

227 ***Physical activity***

228

229 The results of all the models conducted for this dependent variable are shown in Table 5. The
230 inclusion of time as a predictor did not improve the model's fit compared to the fully unconditional
231 model, $\chi^2(1) = 1.19$, $p = .27$. The results of TAOP model showed a non-significant effect of time on
232 physical activity, $\gamma_{10} = 0.02$, $SE = 0.02$, $CI_{95}[-0.02, 0.06]$, $t(919) = 1.09$, $p = .27$. Compared with TAOP
233 model, the results of the conditional model that included the intervention as a predictor, did not

234 improve the model's fit, $\chi^2(2) = 3.16, p = .21$. Including temporal variable as a random effect
235 demonstrated a significant improvement in the model, compared to the conditional model with
236 time as a fixed effect, $\chi^2(2) = 12.39, p = .002$. The results of this conditional model showed that the
237 difference in estimated change month by month between experimental and control group was not
238 statistically significant, $\gamma_{11} = 0.03, SE = 0.05, CI_{95} [-0.06, 0.12], t(448) = 0.67, p = .50$. The standardized
239 coefficients showed that experimental group increased 0.01 *SD* of days a week of physical activity
240 month by month.

241

242 (INSERT TABLE 5)

243

244 ***Eating disorder risk***

245

246 The results of all the models conducted for this dependent variable are shown in Table 6. The
247 inclusion of time as a predictor significantly increased the variance explained by the model,
248 compared to the unconditional model, $\chi^2(1) = 13.63, p = <.001$. The results of TAOP model
249 demonstrated a significant effect of time on ED risk, $\gamma_{10} = -0.42, SE = 0.11, CI_{95} [-0.65, -0.20], t(903)$
250 $= -3.70, p = <.001$. On average, participants tend to decrease 0.42 units of ED risk month by month.
251 The inclusion of intervention as a predictor did not improve the model's fit, $\chi^2(2) = 5.25, p = .07$. The
252 conditional model including time as a random effect represents a significant improvement of the
253 model's fit compared to the conditional model with time as fixed effect, $\chi^2(2) = 26.77, p = <.001$.
254 The results of this conditional model showed a not statistically significant effect of the intervention
255 on eating disorder risk, $\gamma_{11} = 0.01, SE = 0.25, CI_{95} [-0.49, 0.50], t(445) = 0.02, p = .85$. From one month
256 to the other, participants in the experimental group increased 0.0004 *SD* of ED risk more than the
257 participants in the control group.

258

259 (INSERT TABLE 6)

260

261 ***Thin-ideal internalization***

262

263 The results of all the models conducted for this dependent variable are shown in Table 7.
264 Compared to the fully unconditional model, the inclusion of time as a predictor significantly
265 improved the model's fit, $\chi^2(1) = 14.06, p = <.001$. In TAOP model, a significant effect of time on thin
266 ideal internalization was observed, $\gamma_{10} = -0.20, SE = 0.05, CI_{95} [-0.31, -0.10], t(918) = -3.76, p = <.001$.
267 On average, participants tended to decrease 0.20 units of thin ideal internalization from one month

268 to another. An improvement of the model was not observed when the intervention was included as
269 a predictor, $\chi^2(1) = 1.75, p = .42$. When running a conditional model with time as a random effect,
270 convergence problems were found, so the model that included time as a fixed effect was kept.
271 Results of this conditional model showed no statistical differences between groups in estimated
272 change month by month, $\gamma_{11} = -0.01, SE = 0.02, CI_{95} [-0.22, 0.20], t(854) = -0.63, p = .52$. For
273 participants of the experimental group, a non significant decrease of 0.002 *SD* of thin ideal
274 internalization was estimated from one month to the other.

275

276 (INSERT TABLE 7)

277

278 **Discussion**

279

280 The goal of the present study was to assess the efficacy of the *PIA-2 Program*, oriented to the
281 integrated prevention of body image, weight and eating-related disorders in female adolescents
282 from Argentina. The three-session program produced positive results in one of the four variables
283 under study. Specifically, a decrease in the frequency of weekly skipping breakfast was found three
284 months after completion of the intervention. Such a finding is in line with what was expected, since
285 one of PIA-2 program's goals is promoting healthy eating habits, and it includes activities in which
286 the importance of not skipping meals, mainly breakfast, is highlighted. However, although the
287 program also includes activities oriented to the promotion of healthy habits of physical activity, the
288 reduction of body dissatisfaction and the development of strategies to oppose the thin-ideal, the
289 intervention did not produce a statistically significant effect on the weekly frequency of physical
290 activity, ED risk, or thin-ideal internalization. Efficacy studies of interventions akin to the *PIA-2*
291 *Program* have yielded similar results. For example, after implementing a prevention program for
292 Latin women, Franko et al. (2012) found positive results in the eating habits of participants (higher
293 consumption of fruits and vegetables), but the intervention had no impact on body dissatisfaction
294 or on thin-ideal internalization. In line with this, Stock et al. (2007), when assessing the efficacy of
295 the *Healthy Buddies* program, found an increase in the knowledge about healthy eating after the
296 intervention, but no differences between the control group and the experimental group with
297 respect to the perception of body image, or dysfunctional eating attitudes. Finally, in an
298 effectiveness study, when implementing an integrated program oriented to the prevention of
299 problems related to eating, weight and body image, Sánchez Carracedo et al. (2016) did not find
300 effects of the intervention on two of the variables that are part of the eating risk index of EDI-3

301 (Body dissatisfaction and Drive for thinness). However, in that study, a decrease in thin-ideal
302 internalization was found, as well as in dysfunctional eating attitudes.

303 Moreover, in Latin America, two integrated prevention programs implemented in Mexico and
304 Brazil, also obtained not-so-favorable results. In Mexico, Castillo et al. (2019) observed a reduction
305 of internalization and dysfunctional eating attitudes in women who participated in the program.
306 However, they acknowledged that the effect size was too small to conclude that the program was
307 efficacious. In addition, they did not obtain any changes in body dissatisfaction or physical activity.
308 In turn, Leme et. al (2019), when implementing the *Healthy habits, healthy girls* program in Brazil,
309 did achieve some changes in eating-related socio-cognitive variables, but they also observed an
310 increase in dysfunctional weight-loss behaviors. This led them to conclude that this program was
311 not recommended for dissemination with this population.

312 The presence of mixed results in some integrated prevention programs raises the need to
313 review and adjust the interventions in order to achieve efficacy. Leme et. al (2019), for example,
314 propose improving the *Healthy habits, healthy girls* program implemented in Brazil by including
315 activities based on cognitive dissonance theory, since those programs have strong empirical
316 support. In effect, the EDs prevention programs under the general denomination of *Body Project*,
317 based on cognitive dissonance, have shown good results in terms of the reduction of thin-ideal
318 internalization and the decrease of dysfunctional eating behaviors in a great number of efficacy and
319 effectiveness studies (Dakanalis et al., 2019). In fact, after implementing the *Body Project* in Brazil
320 (Amaral et al., 2019), a reduction of the thin-ideal internalization, body dissatisfaction, and
321 dysfunctional behaviors and attitudes was also achieved. Despite the small size of the sample and
322 the absence of follow up, results suggest that it is an efficacious intervention for women who live in
323 Brazil. Such promising results match those obtained in Argentina when implementing the *PIA*
324 *Program* (Rutzstein et al., 2019), also based on the principles of cognitive dissonance. Specifically,
325 *PIA Program* achieved a statistically-significant post-intervention reduction of the thin-ideal, bulimic
326 attitudes, drive for thinness, and body image concerns, with effects maintained at follow-up for
327 these two variables (Rutzstein et. al, 2019). Since *PIA-2 Program* is an integrated prevention
328 program –and not exclusively focused on EDs as *PIA Program*–, the duration of sessions was
329 extended from 60 to 90 minutes, with the aim of including three theme modules in each session:
330 Body image, Healthy eating, and Movement/Physical activity. Considering the differences in the
331 results of the present study compared to those obtained by *PIA Program* (Rutzstein et al., 2019), it
332 is possible that having debated different topics in each session, may have resulted in a lesser focus
333 on each of them. Also, it is possible that having extended the duration of sessions may have
334 contributed to a decrease in the attentional span of adolescents. According to the Cognitive Load

335 Theory, duration and complexity of learning tasks can overload the limited capacity to process
336 information, especially in adolescents (Sewell et al., 2019).

337 As Le et al. (2017) have highlighted, the field of the integrated prevention of EDs and obesity
338 is still in its infancy, and it is necessary to expand the research on its efficacy and effectiveness.
339 Although the integrated approach has been posed as a theoretically efficient option, that has the
340 advantage of avoiding the potentially contradictory effects of prevention programs specifically
341 oriented to EDs or obesity (Neumark-Sztainer, 2005), more effective interventions are required.
342 Also, most integrated prevention studies have been performed in countries with important cultural
343 and demographic differences from Argentina, and just a few have been designed and conducted in
344 Latin America. Therefore, cultural specificities must be considered and brought to mind when
345 developing prevention programs.

346 Furthermore, because we are dealing with a universal-selective intervention, a potential “floor
347 effect” must be considered, as pointed out by many studies (Schwartz et al., 2019; Watson et al.,
348 2016; Wilksch, 2014). We must bear in mind that the assessment instruments that have been used
349 were originally designed for clinical populations.

350 Additionally, a small part of the study was conducted after the confinement due to the COVID-
351 19 pandemic, which might have had some impact on the results. Also, although schools were
352 randomly assigned to the experimental groups, the assignment of participants was not random but
353 determined by the school they attended. Finally, as it was a non-probability sample, the results
354 might not be generalizable

355 As a strong point, we would like to highlight that this is pioneering research in Argentina and
356 the region, since very few studies on integrated prevention have been published in Latin America.
357 It is crucial to continue with efforts aimed at developing programs that are suited to the specific
358 needs of the population of Latin American countries. In this aspect, our study is undoubtedly an
359 important contribution.

360 Future lines of research might include potential modifications of the *PIA-2 Program* in order
361 to improve results. First, adding sessions, each of which would be focused on a single topic and of a
362 shorter duration, might produce a bigger impact on participants. Along these lines, proposing tasks
363 of activism that involve fostering changes in the sociocultural realm, might increase the impact of
364 the intervention. For example, *MABIC Program* showed significant results only after a booster
365 session aimed at working on companies’ responses to the letters of complaint written by the
366 participants in the final session. In fact, it has been found that increased empowerment and self-
367 efficacy are linked to more positive body image (Sánchez-Carracedo et al., 2016; Swami et al., 2019).
368 Also, adding booster sessions could have a positive impact on long-term changes.

369 Finally, we highlight the importance of working collaboratively with teams from other Latin
370 American countries, in order to promote the growth of the field of prevention, regarding cultural
371 particularities shared by our societies. Economic obstacles and limitations for the dissemination of
372 research output are common to developing countries, so generating networks is imperative if we
373 are to overcome these difficulties.

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Table 1*Program PIA-2 modules*

Body image	Critical analysis of magazine ads and Instagram images is promoted. The ideals of beauty as a social construction are discussed by sharing videos on changing ideals over time and in different cultures. The physical consequences and costs of trying to achieve a thin ideal are also discussed. Through role-playing activities, cognitive dissonance about the ideal of thinness is promoted. The participants share experiences that lead to the development of coping strategies against social pressure towards thinness.
Healthy eating	The topic of food groups and the importance of including them in meals is discussed through various games. Also, the advantages of avoiding restrictive diets and regular meal skipping are highlighted. Drinking water and reducing the consumption of sugary drinks are promoted.
Physical activity / Movement	The concept of sedentary lifestyle is introduced and its negative consequences are explained. Pleasant, sustained, bespoke physical activity is promoted as an alternative.

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Figure 1
Sample flow diagram

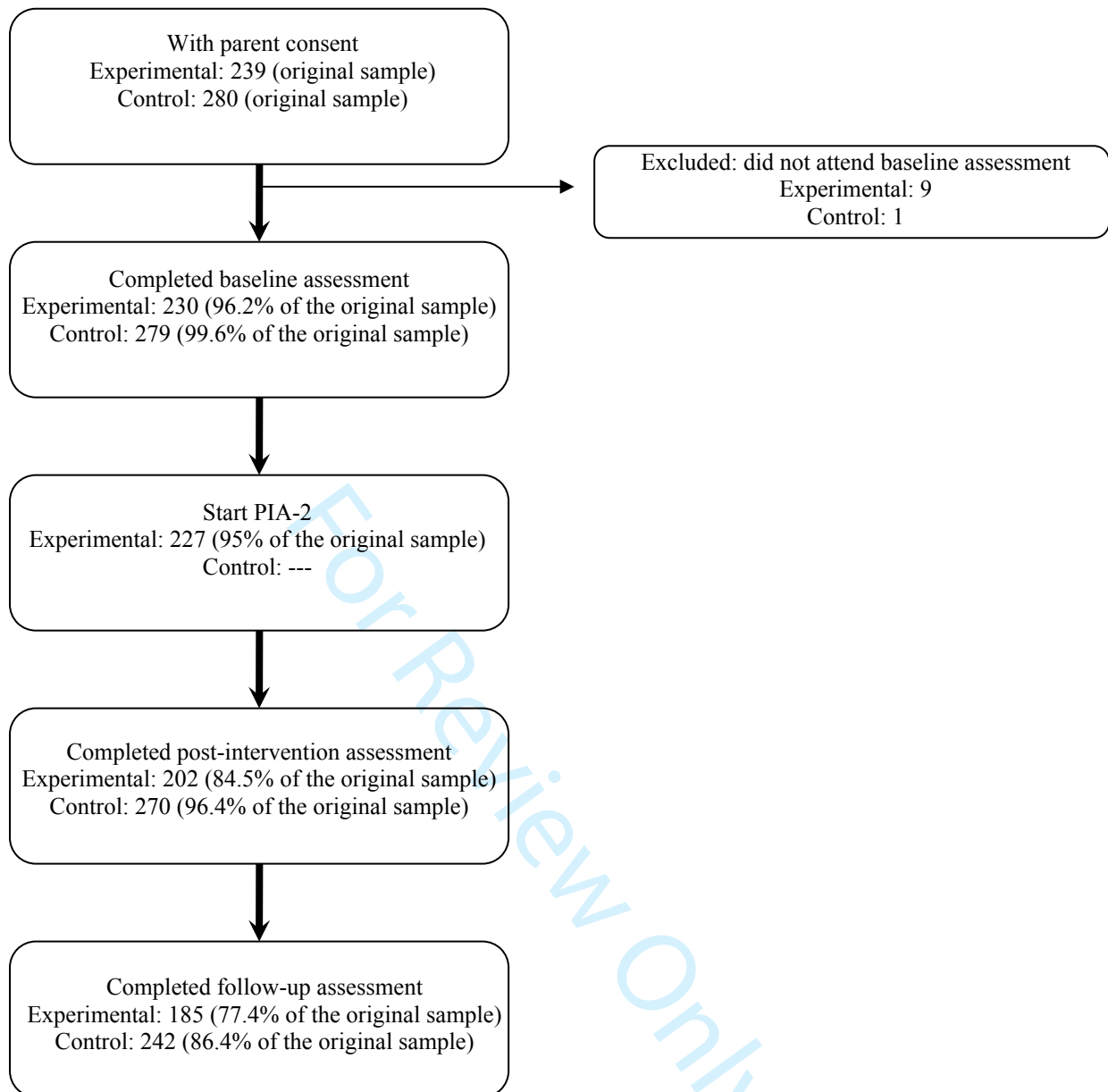


Table 2*Age and self-reported BMI at baseline*

	Experimental	Control	t-Student		
	Mean (SD)	Mean (SD)	<i>t</i>	<i>gl</i>	<i>p</i>
Age (years)	15.13 (1.30)	15.59 (1.26)	-4.00	507	<.001***
BMI (kg/m ²)	22.46 (3.90)	22.93 (4.75)	-1.18	476	.240

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 3*Variables at baseline*

	Experimental	Control	t-Student		
	Mean (SD)	Mean (SD)	<i>t</i>	<i>gl</i>	<i>p</i>
Skipping breakfast	2.88 (2.40)	2.58 (2.43)	1.35	494	.176
Physical activity	2.62 (1.96)	2.41 (1.94)	1.23	505	.219
Eating disorder risk	34.04 (17.21)	28.80 (16.54)	3.49	503	<.001
Thin-ideal internalization	17.60 (4.80)	15.93 (5.32)	3.65	501	<.001***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 4*Results of the unconditional model, time-as-only predictor model, and conditional models with intervention and time as predictors of skipping breakfast*

	Fully unconditional model		Time as only predictor model		Conditional model Time as fixed effect		
	β	<i>SE</i>	β	<i>SE</i>	β	<i>SE</i>	<i>SD</i>
	<i>Skipping breakfast</i>						
Intercept	2.70***	0.09	2.75***	0.11	3.11***	0.15	
Month			0.02	0.02	0.10**	0.03	
Int					-0.83***	0.22	
Int \times Month					-0.18***	0.05	-0.07
Model comparison	$\chi^2(1) = 0.60, p = .44$				$\chi^2(2) = 18.26, p < .001$		

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 5

Results of the unconditional model, time-as-only predictor model, and conditional models with intervention and time as predictors of physical activity

	Fully unconditional model		Time as only predictor model		Conditional model Time as fixed effect		Conditional model Time as random effect		
	β	SE	β	SE	β	SE	β	SE	SD
<i>Physical activity</i>									
Intercept	2.63***	0.14	2.69***	0.15	2.47***	0.17	2.47***	0.17	
Month			0.02	0.02	0.01	0.03	0.01	0.03	
Int					0.51	0.26	0.51	0.26	
Int \times Month					0.03	0.04	0.03	0.05	0.01
Model comparison			$\chi^2(1) = 1.19, p = .27$		$\chi^2(2) = 3.16, p = .21$		$\chi^2(2) = 12.39, p = .002$		

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 6

Results of the unconditional model, time-as-only predictor model, and conditional models with intervention and time as predictors of eating disorder risk

	Fully unconditional model		Time as only predictor model		Conditional model Time as fixed effect		Conditional model Time as random effect		
	β	SE	β	SE	β	SE	β	SE	SD
<i>Eating disorder risk</i>									
Intercept	29.52***	1.29	28.44***	0.15	26.30***	1.35	26.21***	1.32	
Month			-0.42**	0.11	-0.42**	0.15	-0.45*	0.17	
Int					5.06*	2.04	5.05*	1.99	
Int \times Month					-0.0004	0.23	0.01	0.25	0.0004
Model comparison			$\chi^2(1) = 13.63, p = <.001$		$\chi^2(2) = 5.25, p = .07$		$\chi^2(2) = 26.77, p < .001$		

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 7

Results of the unconditional model, time-as-only predictor model, and conditional models with intervention and time as predictors of thin-ideal internalization

	Fully unconditional model		Time as only predictor model		Conditional model Time as fixed effect		
	β	SE	β	SE	β	SE	SD
<i>Thin-ideal internalization</i>							
Intercept	15.89***	0.38	15.38***	0.40	14.98***	0.49	
Month			-0.20***	0.05	-0.20**	0.07	
Int					0.93	0.74	
Int \times Month					-0.001	0.11	-0.01
Model comparison			$\chi^2(1) = 14.06, p = <.001$		$\chi^2(1) = 1.75, p = .42$		

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Resumen en español

Objetivo: El objetivo de este estudio fue evaluar la eficacia de un programa de prevención integrada para trastornos alimentarios y obesidad (PIA-2) en mujeres adolescentes de Argentina mediante la comparación con un grupo control.

Método: La muestra final incluyó a 509 adolescentes entre 13 y 18 años ($M = 15,39$ y $DE = 1,30$) que completaron cuestionarios autoadministrables en tres momentos: línea de base, post-intervención y seguimiento a los 3 meses. Las variables dependientes evaluadas fueron salteo del desayuno, actividad física, riesgo de trastorno alimentario e internalización del ideal de delgadez. El programa se llevó a cabo en tres sesiones de 90 minutos dentro del horario escolar habitual, con intervalos de 1 semana.

Resultados: Se observó un efecto significativo de la intervención en la frecuencia de salteo del desayuno. No se encontró un efecto significativo de la intervención sobre actividad física, riesgo de trastorno alimentario e internalización del ideal de delgadez.

Discusión: La presencia de resultados mixtos evidencia la necesidad de realizar ajustes a la intervención con el fin de mejorar los resultados. Se destaca la importancia de promover un trabajo conjunto con otros países latinoamericanos con el objetivo de incrementar los estudios de campo y la eficacia de los programas dirigidos a la prevención de todo el espectro de problemas relacionados con la alimentación, el peso y la imagen corporal en sociedades que presentan características culturales similares.