

2 Longitudinal Analysis of the Role of Family Functioning 3 in Substance Use

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7 **Abstract** Substance use during adolescence and emerg-
8 ing adulthood is a risk factor for subsequent substance
9 abuse, and it may be related to emotional and behavioral
10 problems. Research shows the importance of family rela-
11 tionships in preventing substance use. However, much of
12 the research in this field comes from large cross-sectional
13 and epidemiological studies, and there is a lack of longi-
14 tudinal studies that analyze both the intra-individual
15 change and the protection factors associated to it. Using
16 HLM analysis, the present longitudinal study found a linear
17 increase of substance use throughout adolescence and
18 emerging adulthood. We found no differences in early
19 adolescence between sexes, but boys increased substance
20 use more than girls throughout adolescence. Moreover,
21 adolescents who remembered caring mothers during
22 childhood reported less substance use during early ado-
23 lescence, and those with more cohesive families showed
24 less increase in substance use during adolescence and
25 emerging adulthood. Finally, we discuss the importance of
26 family care and family cohesion on preventing substance
28 use during adolescence and emerging adulthood.

29 **Keywords** Family · Substance use · Adolescence ·
30 Emerging adulthood · Longitudinal analysis

Introduction 31

The interval between puberty and early adulthood is a 32
developmental stage in which experimentation and risk- 33
taking are relatively frequent and even normative. From 34
puberty many adolescents begin to consume alcohol, to- 35
bacco, or cannabis (Kuntsche and Müller 2012; Ramos 36
et al. 2011). Throughout adolescence substance use 37
gradually increases until reaching its peak during emerging 38
adulthood, at which point it begins to decrease (Chassin 39
et al. 2004; Maggs and Schulenberg 2004). 40

The fact that substance use is widespread among young 41
people should not lead us to ignore its negative conse- 42
quences for health. Ample empirical evidence indicates 43
that substance abuse provokes important short-, medium- 44
and long-term difficulties, both at the physical and the 45
psychological level (Chassin et al. 2009). There are a great 46
deal of studies revealing that consumption of alcohol and 47
other harmful substances during adolescence can alter the 48
normal neurological development of the brain when it is in 49
an intense process of maturation (Lydon et al. 2014; 50
Squeglia et al. 2009; Squeglia et al. 2012). This would have 51
an important impact at psychological and behavioral levels, 52
even facilitating the development of addictive behavior. In 53
fact, early initiation in substance use is one of the main 54
predictors of subsequent abusive consumption (Chambers 55
et al. 2003). Several longitudinal studies have found ado- 56
lescents whose early substance use initiation is associated 57
with a significant increase in consumption and worse 58
subsequent consequences (Chassin et al. 2002; Abroms 59
et al. 2005; Wilks et al. 2004). The idea that early sub- 60
stance use can lead to subsequent abusive consumption is 61
also consistent with data from animal experimentation 62
showing that adolescents, in contrast to adults, present a 63
different sensitivity to the effects of drugs, which makes 64

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65 them more vulnerable to addictions (Higuera-Matas et al.
66 2008; Spear and Varlinskaya 2005).

67 The great social concern generated by adolescent sub-
68 stance use is revealed in the large amount of prevalent data
69 from cross-sectional studies. These studies showed an in-
70 crease in substance use over time throughout adolescence
71 and emerging adulthood and higher substance use among
72 males compared with females (Jiménez-Iglesias et al. 2013;
73 Kuntsche et al. 2004). Nevertheless, these differences be-
74 tween the sexes are narrowing in many Western countries
75 (Keyes et al. 2011; Kuntsche et al. 2011). However, there is
76 a lack of data coming from longitudinal research that
77 analyzes developmental trajectories of substance use
78 throughout adolescence and emerging adulthood, and none
79 in a Spanish context. But only longitudinal studies allow to
80 identify the diversity of trajectories that are masked in the
81 global substance use increase found in cross-sectional
82 studies (Chassin et al. 2002; Flory et al. 2004; Maggs
83 and Schulenberg 2004; Schulenberg and Maggs 2002).
84 Longitudinal studies indicate that there are no differences
85 in substance use between the sexes at the beginning of
86 adolescence, but males increase substance consumption
87 over time more than females. So, during late adolescence
88 and emerging adulthood men present higher levels of
89 substance use than women (Biehl et al. 2007; Duncan
90 et al. 2006).

91 Moreover, longitudinal studies also permit us to detect
92 factors related both to the initial levels of substance use and
93 its trajectory through time. Family context can be an im-
94 portant protective factor against problem behaviors, such as
95 substance use (Kelly et al. 2011; Stice and Barrera 1995).
96 Parental control or monitoring has clearly shown its in-
97 fluence in the prevention of substance use (DiClemente
98 et al. 2001; Dick et al. 2007; Dishion and Loeber 1985).
99 Moreover, the affective dimension of parent–child rela-
100 tionships has also been shown to be relevant. Specifically,
101 the affective bond with parents, parental responsiveness
102 and support, and family cohesion are variables that have
103 been postulated to be factors that prevent adolescent sub-
104 stance use (Baumrind 1991; Farrell et al. 1995; Kopac et al.
105 2012). The mechanisms that may explain this relationship
106 are of two types. Firstly, according to the Theory of Social
107 Control (Akers and Sellers 2004; Gottfredson and Hirschi
108 1990), adolescents usually show a natural tendency toward
109 deviant behaviors that are offset by the prosocial control
110 carried out by the family and other institutions. When
111 adolescents grow up in an environment of affection and
112 closeness to their parents, they are inclined to act in non
113 deviant ways in order to attain their approval. In contrast, if
114 the parent–child relations are marked by detachment, an-
115 tisocial tendencies will be openly manifested.

116 Another mechanism that may justify the relationship
117 between family relationships and substance use is of

118 neuronal character. According to this mechanism, a link
119 between the affective bond established in childhood and
120 substance use can be found. The first data in support of this
121 influence comes from animal experimentation, which has
122 revealed the relation of close physical contact between
123 mother and offspring to the production of oxytocin and
124 dopamine. Taking into account that dopamine plays an
125 important role in prefrontal brain development, it has been
126 proposed that strengthening the inputs of dopamine is the
127 mechanism through which affection in parenting style and
128 warm emotional experiences with parents and caregivers
129 will contribute to the maturity of the prefrontal cortex.
130 Some of the functions of the prefrontal cortex are impulse
131 control, decision-making and anticipation of results (Casey
132 et al. 2011; Eisler and Levine 2002; Somerville et al. 2010;
133 Steinberg 2007). Therefore, such prefrontal maturation
134 promoted by parental affection would allow adolescents a
135 better regulation of their behavior, so preventing the onset
136 of addictions (Steinberg 2007). In fact, there is important
137 empirical support for the relation between low self-control
138 and some risk-taking behaviors such as substance use (De
139 Ridder et al. 2012; Ford and Blumenstein 2013). In a
140 similar vein, there is empirical evidence finding that chil-
141 dren living in family contexts characterized by lack of
142 affection and who develop insecure attachments are at
143 greater risk of emotional and behavioral problems in ado-
144 lescence and emerging adulthood (Cicchetti et al. 1995;
145 Kassel et al. 2007).

146 The main goal of the present study was to analyze the
147 influence of family relationships on the trend of substance
148 use in a sample of Andalusian (South Spain) youths
149 throughout adolescence and emerging adulthood. The
150 longitudinal design allows us to analyze the intra-indi-
151 vidual change in substance use throughout this period, our
152 second goal. Although many studies have focused on some
153 concrete substances such as tobacco or alcohol, in this
154 work, we decided to combine the use of different sub-
155 stances into a single variable, enabling us to compute an
156 interval variable that provides clear advantages for statis-
157 tical analysis (Simons-Morton 2007). The first step was to
158 analyze the substance use trend throughout adolescence
159 and emerging adulthood. Our hypothesis was that, although
160 there is a general trend of continued increasing substance
161 use, there will be differences between participants, both in
162 consumption at the beginning of adolescence and in the
163 magnitude of the increase over time. The second step was
164 to analyze whether initial substance use and the trajectories
165 followed are different as a function of sex and family co-
166hesion. In this regard, we hypothesized that boys will
167 increase substance consumption over time more than fe-
168males, and that both initial substance use and its increase
169 over time would be lower among subjects who reported
170 better family relationships.

171 **Method**

172 **Participants**

173 This work is a longitudinal study of a specific group of
 174 adolescents. It all begins with cross-sectional research on a
 175 sample made up of 513 adolescents between 12 and
 176 19 years of age, from ten different schools in the city of
 177 Seville (southern Spain) and its province. The choice of
 178 primary and secondary schools where the adolescents were
 179 recruited took into account criteria such as whether they
 180 were rural or urban and the socioeconomic level of the
 181 families. For further information about the sampling pro-
 182 cedure, see (citation omitted for blind review).

183 Of the initial sample of 513 adolescents, 136 were early
 184 adolescents between 12 and 14 years of age who were
 185 followed for 10 years, until the participants reached 21 or
 186 23 years of age. Specifically, all participants completed the
 187 assessment instruments at four different stages: early ado-
 188 lescence (Wave 1), mid adolescence (Wave 2), late
 189 adolescence (Wave 3), and during early adulthood (Wave
 190 4). There were 136 adolescents for W1, 114 for Wave 2,
 191 101 for Wave 3 and 90 for Wave 4. The final sample
 192 included 90 adolescents (Table 1). Of the 136 participants
 193 for W1, 90 continued until W4, which is more than two-
 194 thirds of the initial sample. The average ages in early (W1),
 195 mid (W2), late (W3) adolescence and early adulthood (W4)
 196 were: W1 ($M_{age} = 13.11$; $SD = .44$); W2 ($M_{age} = 15.38$;
 197 $SD = .56$); W3 ($M_{age} = 17.85$; $SD = .52$); W4 ($M_{age} =$
 198 21.73 ; $SD = .61$).

199 At W4, most of the young people lived with their par-
 200 ents (77 % of the boys and 96.4 % of the girls). Half of the
 201 boys were employed, 43.3 % exclusively, and 16.7 %
 202 combined work with studies. The percentage of girls who
 203 were studying was greater—50 % were dedicated exclu-
 204 sively to their university or vocational and educational
 205 training, and almost 21 % were also working. None of the
 206 females, but one of the males in the sample, had children at
 207 the time when the data was collected.

208 The *attrition analysis* found no significant differences in
 209 terms of sex, parental educational level or rural/urban
 210 setting, neither in the variables overprotection nor in family
 211 cohesion. However, among those who continued, there
 212 were somewhat more adolescents who had attended charter
 213 schools compared with those who had attended public
 214 schools ($\chi^2 = 4.11$, $p = .043$, Cramer's $V = .042$), and

more adolescents who recalled higher maternal care ($F(1, 129) = 6.13$, $p = .015$, $\eta^2 = .045$). 215
216

Procedure 217

The first data collection (W1) took place during the 1998– 218
 1999 academic year, from September to June. The second 219
 (W2) took place from September 2000 to June 2001, the 220
 third (W3) from September 2002 to June 2003 and the 221
 fourth (W4) between the end of 2007 and the beginning of 222
 2008. 223

The first step in W1 was to select the schools. Once the 224
 Board of Directors agreed to participate, the classrooms 225
 where the data would be collected were selected. Once 226
 parental permission was obtained, members of the research 227
 team applied the questionnaires anonymously and collec- 228
 tively. Even though participation was voluntary and 229
 without rewards, at W1 (13 years old) all students at the 230
 classroom filled in the questionnaires. To facilitate the 231
 subsequent follow-up, each participant was given a nu- 232
 meric identifier. 233

For W2, data collection was similar, since most of the 234
 girls and boys continued to be enrolled at the same school 235
 as in W1. In the third and fourth data collection (W3 and 236
 W4), once contact had been made with the adolescents, and 237
 they had agreed to continue collaborating in the research 238
 project, an appointment was made to complete the ques- 239
 tionnaire. In W3 and W4 active consent was obtained from 240
 the adolescents, and their anonymity was ensured. In W3 241
 and W4 participants completed the questionnaires indi- 242
 vidualy or collectively in the researchers' office. 243

Measures 244

Parental Bonding Instrument 245

(PBI; Parker et al. 1979), adapted to Spanish by Ballús- 246
 Creus (1991) and Gómez-Beneyto et al. (1993). The PBI, 247
 used only at W1, assesses the adolescent's recall of the 248
 attachment bond with his or her mother during childhood. 249
 The 25 items' scale is composed of two dimensions: *Care* 250
subscale (Crombach's $\alpha = .89$) and *Overprotection* 251
subscale (Crombach's $\alpha = .83$). The items were rated 252
 on a four-point Likert scale. High scores on the subscales 253
 indicate more mothers' care and overprotection. 254

Table 1 Sample description

Sex		Father socioeconomic status			Environment	
Boys N (%)	Girls N (%)	Low N (%)	Medium N (%)	High N (%)	Rural N (%)	Urban N (%)
35 (38.9)	55 (61.1)	40 (46.6)	19 (22.1)	27 (31.4)	22 (24.4)	68 (75.6)

Author Proof

255 *Family Cohesion*

256 We used the Cohesion sub-scale of the Spanish version of
 257 the *Family Adaptability and Cohesion Scale*, (FACES II,
 258 Olson et al. 1985). This is a 16 items' likert scale ranging
 259 from 1 to 5 that analyses family cohesion. The Spanish
 260 version of FACES II and III has been validated and widely
 261 used with Spanish and South American samples (López
 262 2002; Martínez-Pampliega et al. 2006). The alpha reliability
 263 coefficients were W1/W2/W3/W4 = .69/.84/.87/.89.

264 *Drug Use*

265 This scale was elaborated for this research and includes
 266 four questions referring to consumption of tobacco, can-
 267 nabis, and alcohol, and episodes of binge drinking (citation
 268 omitted for blind review). Tobacco, alcohol and cannabis
 269 are the most commonly used substances among Spanish
 270 adolescents (Moreno et al. 2013). The adolescents should
 271 indicate the level of substance use on a scale ranging be-
 272 tween 1 (*Never*) and 4 (*More than five times in your life*) in
 273 the case of consumption of cannabis and episodes of binge
 274 drinking, and between 1 (*Never*) and 5 (*Daily*) for alcohol
 275 or tobacco consumption (*More than 3 daily cigarettes*). We
 276 decided to ask for information about binge drinking and
 277 alcohol consumption in order to differentiate subjects with
 278 moderate alcohol consumption from those with a more
 279 problematic one. We combined the four ordinal items into
 280 a continuous single-interval measure (Simons-Morton
 281 2007). The reliability according to Cronbach's alphas at
 282 W1/W2/W3/W4 was .71/.78/.79/.72 respectively.

283 **Data Analysis**

284 To study the intraindividual change of substance use over
 285 time and the influence of the family context in such change,
 286 we performed a linear hierarchical model with the statisti-
 287 cal package HLM (Raudenbush et al. 2011). This analysis
 288 reveals individual patterns of change over time and, at the
 289 same time, allows analyzing which variables affect such
 290 patterns. That is, it shows the change of the dependent
 291 variable (DV) in each individual (Snijder and Bosker
 292 2000). To perform this analysis, firstly, we elaborated the
 293 *null model* to verify possible variability in substance use
 294 between subjects throughout time. Subsequently, we per-
 295 formed the model of *random intersections* to check
 296 possible differences at the beginning of the study; and to
 297 determine whether the substance use trajectories were
 298 different for the participants of the sample. Lastly, we in-
 299 troduced in the model variables that explain both
 300 differences between individuals at the beginning of the
 301 study, at age 13, and the diverse trajectories they followed
 302 throughout adolescence and emerging adulthood. To assess

the fit of each model we used two indexes. On the one 303
 hand, the deviance provided by the program itself, although 304
 there is no required value in order to consider the model 305
 correct, better models obtain low deviance indexes (Rau- 306
 denbush and Bryk 2002). On the other hand, the pseudoR², 307
 an index that should be interpreted like the R² of multiple 308
 regression. PseudoR² is obtained by squaring the correla- 309
 tion between the value predicted in the DV by the model 310
 and the real value of that DV (Hox 2002; Singer and 311
 Willett 2003). 312

Results 313

The results (Table 2) revealed both an increase in substance 314
 use during adolescence and emerging adulthood and also 315
 an increase in inter-individual variability in substance use 316
 over time. There was not a clear developmental trend with 317
 regards to family cohesion during the time of the study. 318

We began the Linear Hierarchical Model (Table 3) by 319
 establishing the *null model*, which showed that the mean 320
 consumption at the four measurement times differed be- 321
 tween participants, $\delta^2 = .33$, $\chi^2(89) = 277.82$, $p < .001$. 322
 This value, along with the residual variance, $\delta^2 = .62$, al- 323
 lowed calculation of the intraclass correlation: 324

$$\rho = \frac{\sigma_{r_0}^2}{\sigma_{r_0}^2 + \sigma_e^2} = \frac{0.33}{0.33 + 0.62} = 0.35$$

Basically, 35 % of the variability in substance con- 326
 sumption throughout adolescence was explained by the 327
 subjects. The model showed a deviance of 952.70. The 328
 model of *random intersections and slopes* (Model 1) 329
 showed the variability in consumption among the par- 330
 ticipants at the beginning of the investigation, $\sigma_{r_0}^2 = .25$, 331
 $p < .001$, and their different evolution across the years of 332
 study, $\sigma_{r_1}^2 = .06$, $p < .001$. This data evidences the fact that 333
 there are different individual trajectories. In this model, the 334
 deviance dropped to 799.40. 335

The next step was to introduce the variable sex at the 336
 second level of analysis, both in the intercept and in the 337
 slope (Model 2). The results revealed no significant dif- 338
 ferences in substance use between boys and girls at age 13. 339
 However they presented different slopes throughout ado- 340
 lescence and emerging adulthood: the increase in substance 341
 use was lower in girls than in boys. The deviance dropped 342
 to 764. 343

Model 3 describes the role of care in adolescent sub- 344
 stance use, and Model 4 adds overprotection to care. Care 345
 and overprotection were included at intercept and at slope. 346
 In these two models sex was removed from the intercept 347
 because model 2 showed that there were no significant 348
 differences between boys and girls at the beginning of the 349

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Table 2 Descriptive analysis of the sample as a function of the instruments used

	Wave 1			Wave 2			Wave 3			Wave 4		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
Care	29.68	4.9	12–36	NA	NA		NA	NA		NA	NA	
Overprotection	16.78	4.74	6–32	NA	NA		NA	NA		NA	NA	
Cohesion	52.37	6.39	38–68	56.76	9.87	24–77	55.6	10.46	29–79	57.89	10.15	27–79
Drug use	1.43	.55	1–3.75	2.04	.88	1–4.25	2.45	.95	1–4.25	2.65	.96	1–4.67

NA not applicable

350 study. The sex variable is kept at level 2 (slope). As can be
 351 seen in Models 3 and 4, family history influenced the onset
 352 level of substance use at age 13 (intercept), but not the
 353 increase produced throughout adolescence and emerging
 354 adulthood (slope). The data indicated that at age 13, ado-
 355 lescents who recalled having received more care in
 356 childhood showed lower substance use. Overprotection did
 357 not significantly contribute to change in substance use.

358 Model 5 shows the role of family cohesion, both at the
 359 intercept and in the interaction with the slope, keeping the
 360 sex variable at level 2. The data indicates that adolescents
 361 who reported lower family cohesion showed more sub-
 362 stance use at age 13, and also increased their consumption
 363 over time.

364 Lastly, Model 6 introduces the variables maternal care at
 365 the intercept (level 1), and sex and family cohesion at slope
 366 (level 2). This model shows that adolescents who recalled
 367 more maternal care during childhood consumed less sub-
 368 stance. Moreover, boys increased substance consumption
 369 more than girls and children in families with lower cohe-
 370 sion showed greater increase in substance use over time.
 371 This model explained 32 % of the variability in substance
 372 use. In turn, the respective PseudoR²s have shown the
 373 improvement of the diverse models both at the beginning
 374 of the research (intercept) and during adolescent and
 375 emerging adulthood (slopes). The best model was number
 376 6.

377 Discussion

378 The results of the present study showed different trajec-
 379 tories of substance use during adolescence and emerging
 380 adulthood, and also showed that family relationships in-
 381 fluence both the initial level of substance use at age 13 and
 382 the different trajectories of substance use throughout time.

383 Adolescents presented different levels of substance use at
 384 age 13 and they also experienced different increasing sub-
 385 stance use trajectories during the next 10 years. Previous
 386 studies of substance use throughout adolescence and
 387 emerging adulthood usually describe the increase of con-
 388 sumption and its normative trajectory, without analyzing

389 individual differences. Few works have taken into account
 390 the advantages of hierarchical methods, which provide a
 391 more complete picture of individual change, showing the
 392 quantity and structure of intraindividual change (Ram and
 393 Gerstorf 2009). Our study extends prior works on substance
 394 use by focusing not so much on normative changes, as on the
 395 within-subject variability hidden behind the linear trajectory
 396 of increased consumption between initial adolescence and
 397 emerging adulthood. In addition, our data has also allowed us
 398 to determine the relationship between some variables and the
 399 magnitude of this increase. Firstly, significant sex differ-
 400 ences emerged. Although in early adolescence boys and girls
 401 substance use was similar, boys increased their consumption
 402 throughout time more than girls.

403 Boys' higher substance use, especially at late adoles-
 404 cence, has been found in diverse studies, both in Spain
 405 (ESTUDES 2013; Ramos and Moreno 2010) and in other
 406 western countries (Kuntsche and Müller 2012; Kuntsch
 407 et al. 2004). There is evidence indicating that in recent
 408 decades the gap between boys and girls has shrunk as a
 409 consequence of changing lifestyles (Keyes et al. 2011;
 410 Kuntsche et al. 2011), such that some studies find no sex
 411 differences in adolescence (Moreno et al. 2013). However,
 412 in late adolescence and early adulthood, substance use is
 413 usually more frequent in males (Evans and Jacobson 2012;
 414 Wilsnack et al. 2002). An explanation for this higher con-
 415 sumption among boys is that girls present earlier psycho-
 416 social maturity, which could lead them to stabilizing sub-
 417 stance use sooner. Some studies have also outlined the role
 418 of greater parental monitoring of girls in their lower sub-
 419 stance use (Svensson 2003). Whereas in the case of boys
 420 such monitoring is probably lower from late adolescence
 421 onwards, in the case of girls, it persists for more years.

422 The results also confirm the hypothesis proposed about
 423 the role of family relationships, both in substance use at the
 424 beginning of adolescence and in its change throughout
 425 time. We found that maternal care during childhood was
 426 significantly related to consumption at age 13 in that sub-
 427 stance use was lower among those adolescents who
 428 recalled more caring relationships. This memory had no
 429 relationship with the trajectory of substance use from that
 430 age onwards.

Table 3 Hierarchical linear model or multilevel model of substance consumption

	Null model β (t, df)	Model 1 β (t, df)	Model 2 β (t, df)	Model 3 β (t, df)	Model 4 B (t, df)	Model 5 β (t, df)	Model 6 β (t, df)
<i>Intercept</i>							
Intercept (participants)	2.14 (29.4**, 89)	1.53 (22.2**, 89)	1.54 (12.83**, 89)	2.47 (4.59**, 88)	3.04 (4.89**, 87)	2.55 (5.03**, 88)	2.5 (5.09**, 88)
Sex		NA	-.017 (-1.2, 88)	NA	NA	NA	NA
Care				-.03†	-.04 (-2.16*, 87)	NA	-.03 (2.14*, 88)
Overprotection				NA	-.02 (-1.74, 87)	NA	NA
Cohesion				NA	NA	-.02 (-2.09*, 88)	NA
<i>Slope</i>							
Intercept (time)		.41 (11.93**, 89)	.50 (8.71**, 88)	.82 (3.64**, 87)	.74 (2.67**, 86)	1.03 (3.96**, 87)	1.11 (4.64**, 87)
Sex		NA	-.14 (-2.04)	-.14 (-2.15*, 87)	-.14 (-2.14*, 86)	-.13 (-2.00*, 87)	-.13 (-2.03*, 87)
Care				-.01 (-2.16*, 87)	-.01 (-1.33, 86)	NA	NA
Overprotection				NA	.003 (.43, 86)	NA	NA
Cohesion				NA	NA	-.01 (-2.07*, 87)	-.01 (-2.60**, 87)
Intra-subject deviance	952.70	763.13	764	764.02	775.85	765.24	761.4
<i>Random effect (variance)</i>	.62	.25	.25	.25	.25	.25	.25
Intercept		.26***	.26***	.23***	.24***	.25***	.24***
Curve		.06***	.05***	.05***	.05***	.05***	.05***
<i>Total pseudoR²</i>							
<i>R²_{Y,Y}</i>		.22	.24	.30	.31	.29	.32
<i>Level 1 pseudoR²</i>							
<i>R²_e</i>		.6	.6	.6	.6	.6	.6
<i>PseudoR² intercept</i>							
<i>R²₀</i>			-.019	.075	.109	.046	.076
<i>PseudoR² curve</i>							
<i>R²₁</i>			.066	.098	.082	.131	.133

NA not applicable

* $p < .05$, ** $p < .01$, *** $p < .001$

431 As commented in the introduction, there are at least two
432 possible explanations for the relationship between care and low
433 substance use at age 13. On the one hand, according to the social
434 control theory (Akers and Sellers 2004), the bond with the
435 parents would help the adolescent to accept conventional values
436 and avoid engaging in misbehavior as a way of achieving
437 parental approval. On the other hand, we can also refer to the
438 probable positive effect that care during childhood could have
439 on the development of the prefrontal cortex. This development
440 would promote emotional and behavioral regulation, prevent-
441 ing subsequent substance use (Steinberg 2007).

442 There is also data indicating that insecure attachment,
443 probably established due to a lack of parents' support and
444 affection, is associated with abusive substance use (Brennan
445 and Shaver 1995; Caspers et al. 2005; Kassel et al. 2007).
446 There is even more abundant evidence supporting the rela-
447 tionship between insecure attachment and diverse indicators
448 of psychological distress, such as low self-esteem (Griffin
449 and Bartholomew 1994; Gamble and Roberts 2005), anxiety
450 (Warren et al. 1997) or difficulties in emotional regulation
451 (Thorberg and Lyvers 2010). These emotional difficulties
452 play an essential role in the etiology of substance abuse, as
453 they may represent an avoidant coping strategy to relieve the
454 psychological distress generated by stressful situations
455 (Kassel et al. 2007; McNally et al. 2003).

456 The fact that low cohesion in the family context was
457 associated with an increase in substance use during adol-
458 escence and emerging adulthood supports this idea. The
459 individuals who had worse family relationships were less
460 likely to approach family figures as a way of coping with
461 adversity. Instead, they tend to seek out other less healthy
462 strategies, such as substance use, to regulate their negative
463 moods and reduce anxiety (Thorberg and Lyvers 2010). It
464 must be taken into account that, during adolescence and
465 emerging adulthood, youths must face many challenges or
466 developmental tasks that will test their coping strategies
467 and may generate them a lot of stress (Arnett 2005).

468 The results of our study revealed that, although con-
469 sumption of substances such as tobacco, alcohol, or
470 cannabis are common during adolescence and emerging
471 adulthood, caring family relationships play a significant
472 role in its prevention. Thus, boys and girls who have ex-
473 perience care and support during childhood, and enjoy a
474 more cohesive family environment during adolescence and
475 emerging adulthood, showed less substance use. Although
476 they initiate consumption during these years, it does not
477 reach the level of substance use observed among those who
478 have grown up in less favorable family contexts.

479 Limitations, Future Directions and Implications

480 To conclude, we must refer to some limitations of the
481 study, such as having a sample of only 90 subjects, which

482 has placed some limits on the generalization of the results
483 obtained. Also, having used self-reports as the only source
484 of information may have increased the relationships found
485 between the variables of the study. Lastly, the longitudinal
486 nature of the study imposes an important limitation related
487 to the use of the instruments, because the selection of
488 measures at the beginning of the study clearly conditions
489 the instruments employed in subsequent data collections. In
490 spite of these limitations, the extension of the study
491 throughout adolescence and emerging adulthood makes it a
492 rare work in Spain. Likewise, the statistical techniques
493 employed have allowed us to take a more in depth look at
494 results found in previous research and to find responses that
495 are not easily accessible from more traditional statistics.

496 Future studies should delve into the role of affection in
497 the process underlying the relationship between the family
498 context and substance use, as well as in the manner of al-
499 leviating the negative consequences of this consumption. In
500 any case, public policies destined towards programs that
501 help promote positive parenting seem necessary, to en-
502 hance parenting skills related to supporting children,
503 showing affection and increasing family cohesion. These
504 policies will be profitable both on a human level, by im-
505 proving the capacity of boys and girls to regulate their own
506 behavior in avoiding not only the abusive use of substances
507 but also other externalizing problems, and on an economic
508 level, by reducing the utilization of public health services.

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