

The mediating role of self-regulation in cigarette smoking and alcohol use among young people

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Título: El papel mediador de la auto-regulación en el consumo de tabaco y alcohol en población joven.

Resumen: Esta investigación estudia el papel de la auto-regulación en los comportamientos de consumo, desde una perspectiva del desarrollo. Se explora la influencia del grupo de iguales y las competencias de los padres en la auto-regulación, en relación con el consumo de sustancias en jóvenes, mediante dos muestras de conveniencia, la primera compuesta por 478 jóvenes con edades comprendidas entre los 10 y los 20 años, siendo la mayoría del género femenino, y la segunda formada por 311 jóvenes, con edades comprendidas entre los 10 y los 17 años, siendo la mayoría del género masculino. Se utilizó un Cuestionario Sociodemográfico (ad hoc), un Cuestionario de consumo de tabaco y alcohol (ad hoc), el Inventario de Auto-regulación en la Adolescencia - versión reducida (IARA-2r), la Escala de Competencias de los Padres y el Cuestionario de Relación de Pareja. Los resultados confirman la existencia de una relación entre género y auto-regulación a largo plazo, más elevada en el género femenino. Los jóvenes con compañeros que fuman o consumen alcohol regularmente, presentan puntuaciones más bajas en las subescalas de auto-regulación a corto plazo. Se confirma una relación positiva moderada entre la auto-regulación a largo plazo y las competencias positivas de los padres.

Palabras clave: jóvenes; auto-regulación; consumo de tabaco; consumo de alcohol; grupo de iguales; competencias de los padres.

Abstract: This research explores the role of self-regulation in substance-use behaviours from a developmental perspective. We explore the influence of the peer group and parental competencies on self-regulation, in relation to substance use in young people, by means of two convenience samples, the first comprising 478 participants aged 10 to 20, the majority of whom were female, and the second made up of 311 youngsters aged 10 to 17, the majority being male. The instruments used were a Sociodemographic Questionnaire (ad hoc), a Smoking and Alcohol Use Questionnaire (ad hoc), the Adolescent Self-Regulatory Inventory - brief version (ASRI-2r), the Parental Competencies Scale and the Peer Relations Questionnaire. The results confirm a relationship between gender and long-term self-regulation, whose level is higher among girls and young women. Those youngsters with friends who smoke or regularly drink alcohol score lower on the short-term self-regulation subscales. A moderate positive relationship is confirmed between long-term self-regulation and positive competencies in parents.

Key words: young people; self-regulation; cigarette smoking; alcohol use; peer group; parents' competencies.

Introduction

Substance use among young people is currently one of the most significant risk factors for social and health problems, especially in view of the fact that it takes place during a phase of life so decisive for physical, psychological and social development (Espada, Méndez, Griffin & Botvin, 2003; Sussman, Unger & Dent, 2004).

In individual terms, the teenage years, and particularly adolescence, is a stage which sees important biological transformations accompanied by substantial changes affecting, for example, one's academic and social context (Frydenberg & Lewis, 1994; Shulman, Carlton-Ford, Levian & Hed, 1995). Likewise, as far as health is concerned, it is a period involving, in addition to low indices of morbidity and mortality compared to other periods of development (Holden & Nitz, 1995), the potential appearance of critical behaviours for the onset of health problems (Fergus & Zimmerman, 2005; Williams, Holmbeck & Greenley, 2002).

Data from recent years have confirmed a relative stability in levels of alcohol use and cigarette smoking among young people, but age at first use continues to be too low, and this is giving increasing cause for concern among those with au-

thority and responsibility in the field of public health (*European School Survey Project on Alcohol and Other Drugs, ESPAD, 2009*).

The aim of the present work is to explore the mediating role of an important developmental variable: self-regulation in relation to health. At the basis of this type of study are the new paradigms developed in recent years in the understanding of health, which dissociate themselves from an illness model to concentrate on a health-centred model, in which efforts are focused on the promotion of health rather than the management of illness (Bandura, 2005; Maes & Karoly, 2005). In fact, research has shown that individuals' predisposition toward healthy behaviours is based on their will, beliefs and attitudes, as well as on motivational and self-regulatory factors (Bandura, 1977, 2005).

Bearing in mind the crucial role of self-regulation in adaptive and maladaptive functioning, it is not surprising that this variable has been studied by a range of authors (see the review in Hoyle, 2008). Inspired by this new trend in the approach to individual development, recent years have seen an exponential increase in research on self-regulation that has given rise to, among other work, two manuals (Boekaerts, Pintrich & Zeidner, 2000; Baumeister & Vohs, 2004).

The role of self-regulation has been studied in the areas of substance use (e.g., Brody & Ge, 2001; Colder & Chassin, 1997; Dias, Garcia del Castillo & Schwarzer, 2008; Novak &

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Clayton, 2001; Wills & Dishion, 2004; Wills, Walker, Mendonza & Anette, 2006), physical exercise (e.g., Karoly, Ruchlman, Okun, Lutz, Newton & Fairholme, 2004; MacDonald & Palfai, 2008), social behaviours (e.g., Crockett, Raffaelli & Shen, 2006; Raffaelli & Crockett, 2003), prosocial behaviour (Bandura, Capra, Barbaranelli, Gerbino, & Pastorelli, 2003; Eisenberg & Fabes, 1998), and school performance (Mischel, Shoda & Rodríguez, 1989; Tangney, Baumeister & Boone, 2004), among others.

There is a wide range of conceptions and definitions, giving rise to different criteria as regards the definition of the concept, its key components and related consequences (Martin & McLellan, 2008). As far as definitions are concerned, there are several, ranging from those which focus on the self-control of external behaviour, that is, adaptation and obedience, to those referring to the control of cognitive systems, that is, the control of attention, the verification of thoughts, problem-solving and autonomous learning (Post, Boyer & Brett, 2006).

Thus, self-regulation could be defined as a flexible capacity for activation, verification and inhibition, with competencies for adapting behaviour, attention, the emotions and cognitive strategies in response to internal and environmental stimuli and stimuli of reaction towards others, so as to achieve the individual's desired goals (Barkeley, 1997; Demetriou, 2000; Diaz & Fruhauf, 1991; Lengua, 2003; Moilanen, 2007a; Novak & Clayton, 2001).

In the specific case of the relationship between self-regulation and substance use, some research has shown that habitual alcohol users have lower levels of self-regulation (Brown, Miller, & Lewandowski, 1999; Wills & Dishion, 2004; Wills et al., 2006). Individuals with low self-regulation competency tend to consume more, with more frequency and with more negative consequences, than those who score higher in self-regulation (Aubrey, Brown, & Miller, 1994). However, other studies have found no significant relationships between self-regulation, experience with substances and substance use (tobacco, alcohol, marijuana, crack and other drugs) (García del Castillo & Dias, 2007). Although they might seem surprising, these results may be related to others suggesting a link between self-regulation and substance abuse (Carey, Neal & Collins, 2004; Neal & Carey, 2005).

Another hypothesis related to these inconsistencies has to do with theoretical issues of adaptation of the concepts to age. In fact, most studies on the role of self-regulation in behaviour have been carried out with samples made up of young adults and adults; its application to adolescents and younger populations in general has been less convincing (Brandtstadter, 1998; Gibbons, Gerrard, Reimer & Pomery, 2006). Moreover, very few studies have analyzed the different sequences of these processes in young people, researchers having largely ignored developmental questions or hypotheses about how behaviours can change in the long term (Fergus & Zimmerman, 2005; Moilanen, 2007a; Williams et al. 2002). Therefore, it is imperative to explore how current

knowledge on self-regulation can be applied to younger age groups, taking into account their specific characteristics.

As regards techniques for the assessment of self-regulation, research has employed those focusing on the most immediate or short-term context (Moilanen, 2007a), related to the control of impulses, the control of attention and emotional control, or regulation of the immediate context. However, the notion of time varies considerably over the lifespan, so that it is necessary to distinguish and evaluate in young people long-term components that are essential in self-regulation (Demetriou, 2000; Moilanen, 2007a), such as the formulation of their motivational and behavioural goals (Husman & Lens, 1999; Oyserman, Terry & Bybee, 2002). Furthermore, there is currently a trend toward conceptualizing self-regulation in development in a global and integrated fashion, including behavioural, cognitive and emotional components (Gestsdottir & Lerner, 2008; Moilanen, 2007a).

In the development of self-regulation, a decisive role would seem to be played by parents' competencies. Recent studies have shown the influence of parents on the development of certain characteristics in their children that help to set them on a course in an indirect way (Finkenauer, Engels & Baumeister, 2005); indeed, all attempts to explain self-regulation in the early years of life and its relationship with undisciplined behaviour reveal the importance of parents as a powerful predictor of self-regulation (Bradley, 2000; Calkins & Fox, 2002; Eisenberg, Sadovsky, Spinrad, Fabes, Losoya, Valiente, Reiser, Cumberland, & Shepard, 2005; Kopp, 1982).

Research findings would appear to confirm higher levels of self-regulation among young people whose parents present greater affectivity, responsibility (e.g., Barber & Harmon, 2002; Baumrind, 1991; Brody & Ge, 2001; Colman, Hardy, Albert, Raffaelli & Crockett, 2006; Vondra, Shaw, Swearingen, Cohen & Owens, 2001), approval and implementation of rules (Lamborn, Mounts, Steinberg & Dornbusch, 1991). On the other hand, the use of punishment (corporal, using threats or removing privileges) can inhibit the development of self-regulation capacities (Grusec & Goodnow, 1994).

In addition to the influence on emotional and behavioural regulation, Grolnick and Farkas (2002) suggest that parenting style is crucially important for the child's peer relationships. The findings of these authors reveal that emotional self-regulation is positively related with parents who promote development and response, but also with those who tolerate and support emotional expression and the autonomous regulation of emotions. They also found that the parental structure and support for independence contribute to an increase youngsters' competencies of behavioural self-regulation (such as initiative and the avoidance of temptation), and that care, as well as close relationships, contributes to progress in the capacity to resist peer group pressure. Nevertheless, few studies have explored the relationship between self-regulation and peer interaction.

As is clear from this brief introduction, youngsters' adjustment appears to depend on the way they manage their emotions, think constructively, regulate and direct their behaviours, control their impulses automatically and react to contexts so as to modify and reduce sources of stress (Compas, Connor-Smith, Saltzman, Harding, Thomsen & Wadsworth, 2001).

In this study we look at the role of self-regulation in substance-use behaviours, from a developmental perspective. Considering Psychology as a developmental science (Greenberg, Partridge, Mosack & Lambdin, 2006), and within a contextualized analysis, we employed a bio-ecological approach (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 1998) to explore the influence of peers and of parents' competencies on self-regulation, in relation to substance use in young people.

Method

Participants

Two convenience samples were used, the first made up of 478 young people aged between 10 and 20 ($M = 13.48$, $SD = 2.26$) the majority of whom were female (55.6%, $N = 266$), and the second made up of 311 young people aged 10 to 17 ($M = 12.30$, $SD = 1.32$), the majority being male (52.8%, $N = 163$).

Instruments

We used a *Sociodemographic Questionnaire* (ad hoc), a *Smoking and Alcohol Use Questionnaire* (ad hoc), the *Adolescent Self-Regulatory Inventory* – brief version (ASRI-2r; Moilanen, García del Castillo & Dias, 2009), the *Parental Competencies Scale* (Teixeira, Oliveira & Wottrich, 2006) and the *Peer Relations Questionnaire* (Rigby & Slee, 1993).

- *Sociodemographic Questionnaire* obtains information on the sociodemographic variables by means of 7 items.
- *Smoking and Alcohol Use Questionnaire* comprises 10 items assessing the use of these substances in terms of quantity and frequency.
- *Adolescent Self-Regulatory Inventory* – brief version (ASRI-2r), is a 24-item instrument for assessing short- and long-term self-regulation.
- *Parental Competencies Scale* is made up 25 items that permit the evaluation of parents' specific capacities, such as emotional support, parental control and punitive control.
- *Peer Relations Questionnaire* is an instrument made up of 12 items for assessing the standard of interaction with peers, allowing a distinction to be made between pro-social, bullying and victim behaviour.

Procedure

Once authorization had been obtained from the authors of the instruments for their adaptation for Portuguese population, they were first translated into Spanish before a bilin-

gual psychologist translated them into English. The next step was to request permission to apply the instruments from the head teachers of the schools (selected according to geographical proximity) and from the parents. The instruments were administered during the normal school timetable, at times arranged with the teachers in question. Total anonymity and confidentiality were guaranteed at all times.

Results

To maintain the results in an appropriate sequence, we shall present the data according to demographic variables and according to smoking and alcohol use, and subsequently the test-retest results.

Higher and more statistically significant scores in long-term self-regulation (SR) were found in girls/young women ($p = .00$), in addition to positive correlations between age and long-term self-regulation ($r = .12$, $p < .05$) and negative correlations between age and short-term self-regulation ($r = -.23$, $p < .01$).

The young people who had never smoked (Table 1) present higher short-term self-regulation ($p = .005$), and show more bullying behaviours in peer relations ($p = .011$), more victim behaviours in peer relations ($p = .003$) and higher emotional support from parents ($p = .027$). Those who reported never having consumed alcohol (Table 2) score higher in short-term self-regulation ($p = .000$), are victims of abuse from their peers ($p = .000$) and receive more punishment-based control from their parents ($p = .001$).

A negative and statistically significant correlation is observed between age at first alcohol use and bullying behaviour ($r = -.15$, $p = .010$) and victim behaviour ($r = -.28$, $p = .000$) in peer relations and punitive control by parents ($r = -.23$, $p = .000$). We also found a relationship between number of cigarettes smoked per day (Table 3), higher number of drunken episodes (binge drinking) in the last month and short-term self-regulation levels ($p = .04$ and $p = .017$, respectively). Those young people who reported episodes of binge drinking (consumption of five or more alcoholic drinks in the space of a few hours) (Table 4) scored higher in short-term self-regulation ($p = .007$) and behavioural control ($p = .016$).

Those youngsters who had never smoked obtained higher global scores, followed by those who had experimented but did not currently smoke, and lower scores were found among those who had experimented and still smoked, in relation to short-term self-regulation ($p = .001$) and victim behaviour in the peer relation ($p = .014$). With regard to alcohol (Table 5), higher global scores were also observed in short-term self-regulation among those who had never consumed it, followed by those who had experimented but did not drink now, and lower scores were found among those who had experimented and still drank ($p = .000$). Higher scores were observed among those who had neither experimented nor consumed and those who had experimented and still consumed, and lower scores were presented by those

who had experimented but did not drink now, in relation to victim behaviour in the peer relationship ($p = .004$) and punitive control by parents ($p = .001$).

Those participants with family members who smoked scored lower in short-term ($p = .00$) and long-term ($p = .01$)

self-regulation and in bullying behaviour in the peer relation ($p = .022$). Among those with family members who drink regularly, we found higher scores in victim behaviour ($p = .037$) and in punitive control by parents ($p = .034$).

Table 1. Self-regulation and lifetime smoking experience.

	Have you ever smoked cigarettes?				t	df	p
	Yes		No				
	M	SD	M	SD			
Short-term SR	34.40	7.02	36.87	7.22	-2.83	390	.01
Long-term SR	36.67	7.20	37.43	8.15	-0.78	390	.44
Bullying	5.09	1.56	5.61	2.31	-2.56	225.28	.01
Victim	6.25	2.06	7.00	2.53	-3.03	189.26	.00
Pro-social	13.02	1.96	13.07	2.16	-0.22	453	.83
Emotional support	39.54	8.92	41.98	9.39	-2.22	410	.03
Behavioural control	28.95	6.23	30.05	6.94	-1.39	417	.17
Punitive control	17.98	5.46	18.63	5.71	-0.99	417	.33

Table 2. Self-regulation and lifetime alcohol use experience.

	Have you ever drunk alcohol?				t	df	p
	Yes		No				
	M	SD	M	SD			
Short-term SR	34.97	6.68	38.48	7.64	-4.69	311.05	.00
Long-term SR	37.50	7.36	36.75	9.07	0.87	288.42	.39
Bullying	5.44	1.99	5.49	2.30	-0.21	45	.83
Victim	6.43	2.11	7.32	2.79	-3.65	328.70	.00
Pro-social	13.04	2.04	12.99	2.34	0.25	454	.80
Emotional support	40.95	9.09	42.35	9.46	-1.51	410	.13
Behavioural control	29.46	6.34	30.41	7.46	-1.35	307.00	.18
Punitive control	17.76	5.32	19.65	6.00	-3.29	309.14	.00

Table 3. Self-regulation and number of cigarettes smoked per day.

	In the past month, how many cigarettes did you smoke per day?				r	p
	None	Fewer than 1	1-5	More than 6		
	Short-term SR	36.31	38.18	32.58		
Long-term SR	36.91	37.25	34.18	35.33	0.53	.66
Bullying	5.72	5.00	5.00	4.86	1.08	.36
Victim	6.90	5.92	5.80	5.57	2.12	.10
Pro-social	12.89	13.50	12.27	13.29	0.80	.49
Emotional support	41.03	44.50	36.58	37.71	1.95	.12
Behavioural control	29.96	31.55	28.00	24.71	2.00	.12
Punitive control	18.67	17.58	18.20	16.86	0.43	.74

Table 4. Self-regulation and binge drinking.

	In the past month, have you drunk 5 or more alcoholic drinks in the space of a few hours?				t	df	p
	Yes		No				
	M	SD	M	SD			
Short-term SR	32.80	7.04	36.53	7.20	-2.73	379	.01
Long-term SR	37.28	5.96	37.41	8.05	-0.09	377	.93
Bullying	5.84	2.29	5.42	2.11	1.08	429	.28
Victim	6.26	2.13	6.85	2.46	-1.31	433	.19
Pro-social	12.84	2.25	13.05	2.18	-0.51	437	.61
Emotional support	39.76	9.26	41.55	9.31	-1.00	394	.32
Behavioural control	27.09	6.11	30.08	6.79	-2.41	403	.02
Punitive control	18.48	5.28	18.47	5.69	0.02	403	.99

Table 5. Self-regulation and alcohol consumption.

	Alcohol consumption			r	p
	No	Yes, but not now	Yes		
Short-term SR	38.46	35.95	34.84	9.35	.00
Long-term SR	36.50	38.27	37.36	1.36	.26
Bullying	5.50	5.32	5.63	0.55	.58
Victim	7.30	6.48	6.53	5.54	.00
Pro-social	12.95	13.14	13.12	0.37	.69
Emotional support	42.03	42.18	40.27	1.63	.20
Behavioural control	30.19	29.65	29.51	0.40	.67
Punitive control	19.55	16.88	18.31	7.14	.00

Youngsters whose group of friends included someone who smoked scored lower in short-term self-regulation ($p = .000$) and victim behaviour in the peer relation ($p = .008$). Those whose group of friends included somebody who regularly drank alcohol scored lower on the subscales short-term self-regulation ($p = .000$) and victim behaviour ($p = .009$) and pro-social behaviour in the peer relation ($p = .034$).

As regards associations between the variables, we observed some interesting correlations (Table 6). There is a negative correlation between short-term self-regulation and bullying behaviour ($r = -.23$, $p = .000$) and victim behaviour in the peer relation ($r = -.17$, $p = .000$). Long-term self-regulation is negatively related to bullying behaviour ($r = -.22$, $p = .000$) and victim behaviour ($r = -.10$, $p = .000$) in the peer relation, and positively to pro-social behaviour in

the peer relation ($r = .30$, $p = .000$), emotional support ($r = .35$, $p = .000$) and behavioural control from parents ($r = .35$, $p = .000$). A positive correlation was found between bullying behaviour and victim behaviour in the peer relation ($r = .35$, $p = .000$), and a negative one with pro-social behaviour ($r = -.28$, $p = .000$), emotional support ($r = -.25$, $p = .000$) and behavioural control ($r = -.19$, $p = .000$); a negative correlation between victim behaviour and pro-social behaviour ($r = -.15$, $p = .000$), emotional support ($r = -.23$, $p = .000$) and behavioural control ($r = -.13$, $p = .000$), and a positive correlation with punitive control ($r = .23$, $p = .000$); and a positive correlation between emotional support and behavioural control ($r = .69$, $p = .000$) and punitive control ($r = .32$, $p = .000$), and between behavioural control and punitive control ($r = .39$, $p = .000$).

Table 6. Self-regulation, peer relation and parental competencies.

	1	2	3	4	5	6	7	8
1. STSR	1							
2. LTSR	-0.09	1						
3. B	-0.23(**)	-0.22(**)	1					
4. V	-0.17(**)	-0.10(*)	0.35(**)	1				
5. PSB	0.05	0.30(**)	-0.28(**)	-0.15(**)	1			
6. ES	0.04	0.35(**)	-0.25(**)	-0.23(**)	0.26(**)	1		
7. BC	0.05	0.35(**)	-0.19(**)	-0.13(*)	0.33(**)	0.69(**)	1	
8. PC	-0.08	-0.07	0.12(*)	0.23(**)	-0.02	0.32(**)	0.39(**)	1

** Significant correlation at 0.01 (2-tailed). * Significant correlation at 0.05 (2-tailed).

Note: STSR – Short-term self-regulation; LTSR – Long-term self-regulation; B – Bullying; V – Victim; PSB – Pro-social behaviour; ES – Emotional support; BC – Behavioural control; PC – Punitive control.

After the inferential studies that permitted the comparison of group means and correlations between variables, we carried out a series of confirmatory analyses to check the validity of the theoretical models formulated. In addition to providing a better explanatory model of the data, they help us to understand the mediating role of self-regulation in substance use through comparison of the correlations between the different variables and smoking and alcohol use.

Successive models were analyzed using the first sample, with the aim of finding the solution with the best fit to the data, specifically in relation to self-regulation (integrating short- and long-term self-regulation) and the direction of the correspondence between self-regulation and the peer relation. Thus, successive alternatives were analyzed until a final solution was obtained. After obtaining a better fit of the model that takes into account only short-term self-regulation, we observed better global goodness-of-fit indices

considering self-regulation as the result of the peer relation ($\chi^2(1313) = 3097.83$; $p = .000$; $\chi^2/df = 2.36$; CFI = 0.77; PCFI = 0.71; RMSEA = .05).

As in the case of the first sample, we made the structural equation models calculations testing the initial model with the second sample, to bring out the intermediary role between the predictors of parental competencies and the peer relation in smoking and alcohol use. The final solution is more parsimonious and maintains a good degree of fit ($\chi^2(847) = 1595.10$; $p = .000$; $\chi^2/df = 1.88$; CFI = .84; PCFI = .75; RMSEA = .05) (Table 7).

The role of self-regulation as mediator between the peer relation and substance use is revealed by the correlation of bullying and victim behaviour with self-regulation ($r = -.39$ and $-.11$), which presents a negative correlation with substance use ($r = -.13$), and higher correlations than in the direct relationship with use ($r = .47$ and $-.13$). As regards par-

ents' competencies and substance use, we observed a higher correlation between emotional support and behavioural control ($r = -.42$ and $.43$) than with the mediation of self-regulation.

Table 7. Comparison of the models.

	χ^2	df	χ^2/df	CFI	PCFI	RMSEA
Model 1	3097.83	1313	2.36	.77	.71	.05
Model 2	1595.10	847	1.88	.84	.75	.05

With the second sample we studied, by means of test-retest, the relationship between self-regulation and substance use in the long term, using repeated-measures tests from the General Linear Model. After identifying and differentiating

between those young people who consumed, those who did not consume and those who had experimented, we selected for these analyses only those who had never used substances and those who started consuming between point 1 and point 2 of the data-collection process.

We found 19 youngsters who began smoking during the period of our research, and 188 who maintained their rate of smoking or did not smoke. Those who smoked presented lower long-term self-regulation (Figure 1) at both point 1 ($F = 7.18$, $p = .008$) and point 2 ($F = 14.32$, $p = .000$) of the data-collection process; in short-term self-regulation we observed lower scores among those who started smoking ($F = 4.21$, $p = .042$).

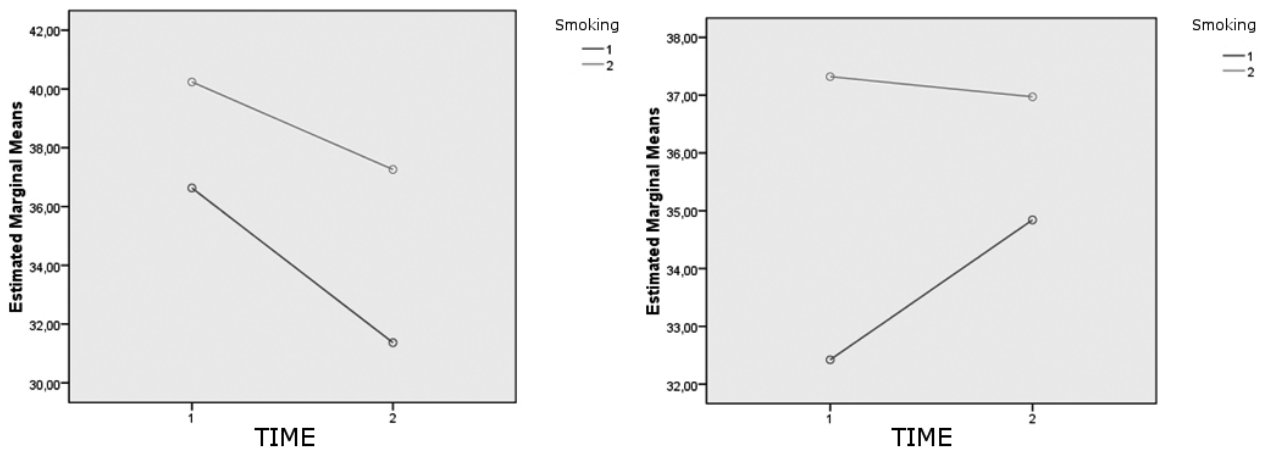


Figure 1. Short- and long-term SR and smoking.

In the second sample we found 22 young people who began drinking alcohol during the period of the research, and 112 who never drank. Comparing the young people's

scores in level of long-term self-regulation (Figure 2), we found significant differences ($F = 12.06$, $p = .001$), but not in the case of short-term self-regulation.

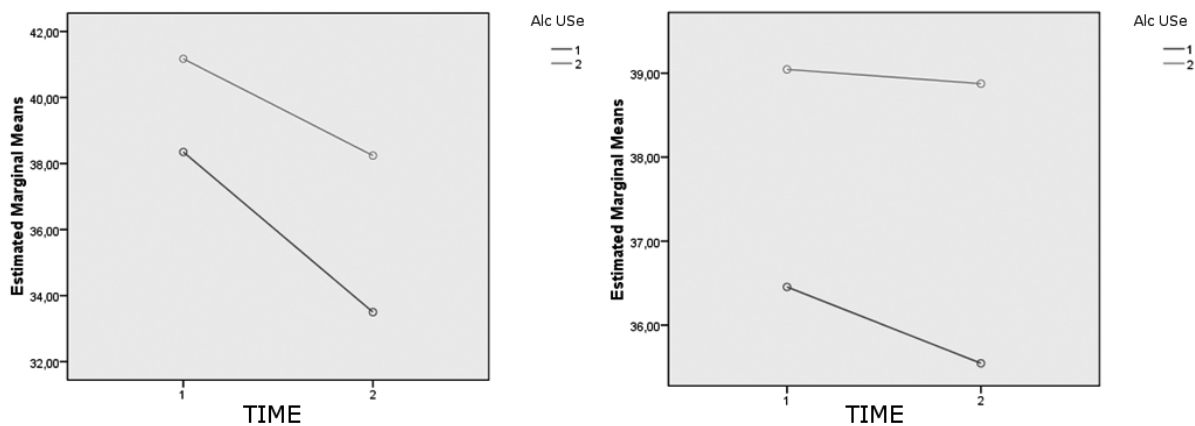


Figure 2. Short- and long-term SR and alcohol.

Discussion

With regard to the gender variable, in differential terms, we observed higher long-term self-regulation in the girls and young women. These results are in line with the findings of some other authors (Buckner, Mezzacappa & Baerdslee, 2009; Colman et al. 2006; García del Castillo & Dias, 2007, 2009; Meece & Painter, 2008; Muñoz-Rivas, Andreu & Gutiérrez, 2005). There are in fact divergent opinions on this gender-based relationship, though in the literature we can also find authors who suggest that from early childhood males show greater difficulties with regard to emotional and behavioural regulation (Kochanska et al., 1997; Kochanska et al., 2000; McCabe & Brooks-Gunn, 2007; Weinberg, Tronick, Cohn & Olson, 1999). Moreover, due to the control exercised by parents, girls are more likely to delay their responses to positive stimulus situations in comparison to boys, and are subject to greater behavioural control. A positive correlation was observed between long-term self-regulation and age, and a negative correlation between short-term self-regulation and age. Some research has found that self-regulation tends to be stable over time (Ayduk, Mendoza-Denton, Mischel, Downey, Peake & Rodriguez, 2000; Kochanska, Murray & Harlan, 2000; Kochanska, Murray & Coy, 1997; Kochanska, Murray, Jacques, Koenig & Vandegest, 1996; Mishel, Shoda & Peake, 1988; Shoda, Mishel & Peake, 1990), but there are also authors who propose the existence of temporal differences associated with different levels of self-regulation and developmental contexts (McCabe & Brooks-Gunn, 2007). The results obtained here go some way to supporting the possibility of changes in the type of self-regulation from the first stages of development, through childhood and adolescence to early adulthood.

In the present work, as also reported in other studies, higher levels of self-regulation were found among those participants who did not drink alcohol or smoke (e.g., Brown et al. 1999; García del Castillo & Dias, 2009; Wills et al. 2006; Wills & Dishion, 2004). Furthermore, a moderate positive relation was confirmed between long-term self-regulation and parents' positive competencies, specifically, emotional support and behavioural control. On the other hand, smoking by a family member was found to have a negative effect on capacities for self-regulation, both short-term and long-term (Grusec & Goodnow, 1994), and was related to higher levels of bullying behaviours in the peer relation. In relation to alcohol use in the family, we found higher scores in victim behaviour in the peer relation and punitive control by parents, results which suggest, contrary to expectations, that alcohol use does not interfere with scores on self-regulation (Eiden, Chavez & Leonard, 1999; Eiden, Edwards & Leonard,

2007; Eiden, Leonard, Hoyle & Chavez, 2004). One interpretation of these data is that parents who drink alcohol are more likely to use punitive control, which results in less commitment, sensitivity and affect in the relationship with their children (Eiden et al. 1999; Eiden et al. 2004), and in turn, to the child's greater susceptibility to victimization situations in peer relationships.

The results of this study also show that youngsters with friends who smoke or regularly drink alcohol score lower on the short-term self-regulation subscales. This indicates that interaction in the group where there is substance use is closely related to low self-regulation, be it due to modelling or to peer pressure to smoke and/or drink (Antonuccio & Lichtenstein, 1980; Conrad, Flay & Hill, 1992; Farrel, Anchors, Danish & Howard, 1992; Harakeh, Engles, Vermulst, de Vries & Scholte, 2007), or indeed, to a notion that substance use increases one's likelihood of being accepted by the group (Dishion, Capaldi, Spracklen & Li, 1995; Graham, Marks, & Hansen, 1991; Kandel, 1996; Oetting & Beauvais, 1987).

As regards other variables studied, the results reveal the importance of short-term self-regulation in the adjustment level of the peer relation, as occurs in the case of delinquency (Krueger, Caspi, Moffitt, White, & Stouthamer-Loeber, 1996) and other behaviour problems (Barkley, 1997; Campbell, Shaw, & Gilliom, 2000; Kochanska & Knaack, 2003; Krueger et al., 1996; Newman, Caspi, Moffitt, & Silva, 1997). A moderate positive relation is confirmed between long-term self-regulation and pro-social behaviour in the peer relation, emotional support and behavioural control by parents (Karreman, van Tuijl, van Aken & Dekovic, 2006).

These results were reinforced by means of structural equation modelling, understanding the role of self-regulation as a mediating variable of parents' competencies, the peer relation and substance use (Bradley, 2000; Calkins & Fox, 2002; Eisenberg et al., 2005; Kopp, 1982). The best indices for explaining smoking and drinking behaviour were found in the low levels of short-term self-regulation and the influence of parents' competencies on bullying behaviour in the peer relation.

The procedure was repeated in a second sample, with a mean age lower than that of the first. We found high indices in the model that considers the role of self-regulation as a mediator between the peer relation and substance use. In the comparison between parents' competencies and substance use we observed a higher correlation between emotional support and behavioural control. In the first sample there appears to be a prevalence of the family's influence in the peer relation and self-regulation as a mediator of substance use; in the second sample the family takes on an even more important role. These results may suggest that self-regulation changes throughout

the age range considered, and has a mediating role in the different stages of young people's behaviour.

Finally, we attempted to verify whether the changes in the levels of self-regulation between the study's two data-collection points could be related to the use of alcohol and smoking. The results show that the youngsters who use substances score lower in long-term self-regulation, and present a reduction in their scores at point 2, for both smoking and drinking. A difference in smoking is also confirmed between the groups in short-term self-regulation. Likewise, we found that self-regulation levels decrease to point 2, suggesting that substance use influences these levels. Future studies, with larger samples and longer assessment periods, may help to clarify this mutual influence between self-regulation and substance use.

References

- Antonuccio, D.O., & Lichtenstein, E. (1980). Peer modeling influences on smoking behavior of heavy and light smokers. *Addictive Behaviors*, 5, 299-306.
- Aubrey, L. L., Brown, J. M., & Miller, W. R. (1994). Psychometric properties of a self-regulation questionnaire (SRQ). *Alcoholism: Clinical & Experimental Research*, 18, 429.
- Ayduk, O., Mendoza-Denton, R., Mischel, W., Downey, G., Peake, P.K., & Rodriguez, M. (2000). Regulating the interpersonal self: Strategic self-regulation for coping with rejection sensitivity. *Journal of Personality and Social Psychology*, 79, 776-792.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review*, 84, 191-215.
- Bandura, A. (2005). The Primacy of Self-Regulation in Health Promotion. *Applied Psychology: An International Review*, 54 (2), 245-254.
- Bandura, A., Capra, G.V., Barbaranelli, C., Gerbino, M., & Pastorelli, C. (2003). Role of affective self-regulatory efficacy in diverse spheres of psychosocial functioning. *Child Development*, 74 (3), 769-782.
- Barber, B. K., & Harmon, E. L. (2002). Violating the self: Parental psychological control of children and adolescents. In B. K. Barber (Ed.), *Intrusive parenting: How psychological control affects children and adolescents* (pp. 15-52). Washington, DC: APA.
- Barkley, R. A. (1997). *ADHD and the nature of self-control*. New York: Guilford.
- Baumeister, R. F., & Vohs, K. D. (2004). *Handbook of self-regulation: Research, theory, and applications*. New York: Guilford.
- Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *Journal of Early Adolescence*, 11(1), 57-95.
- Boekaerts, M., Pintrich, P. R., & Zeidner, M. (Eds.). (2000). *Handbook of self-regulation*. San Diego: Academic Press.
- Bradley, S. J. (2000). *Affect Regulation and the Development of Psychopathology*. New York: Guilford Press.
- Brody, G. H., & Ge, X. (2001). Linking parenting processes and self-regulation to psychological functioning and alcohol use during early adolescence. *Journal of Family Psychology*, 15, 82-94.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge: Harvard University Press.
- Bronfenbrenner, U., & Morris, P. A. (1989). The ecology of developmental processes. In W. Damon, & R. M. Lerner (Eds.), *Handbook of Child Psychology. Vol. 1: Theoretical models of human development* (pp. 993-1028). New York: Wiley.
- Brown, J. M., Miller, W. R., & Lawendowski, L. A. (1999). The Self-Regulation Questionnaire. In L. VandeCreek & T. L. Jackson (Eds.), *Innovations in clinical practice: A sourcebook* (pp. 281-292). Sarasota: Professional Resource Press/Professional Resource Exchange.
- Buckner, J.C., Mezzacappa, E., & Beardslee, W.R. (2009). Self-regulation and its relations to adaptive functioning in low income youths. *American Journal of Orthopsychiatry*, 79 (1), 8-18.
- Calkins, S.D. & Fox, N.A. (2002). Self-regulatory processes in early personality development: A multilevel approach to the study of childhood social withdrawal and aggression. *Development & Psychopathology*, 14, 477-498.
- Campbell, S. B., Shaw, D. S. & Gilliom, M. (2000). Early externalizing behavior problems: toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*, 12 (3), 467-488.
- Carey, K. B., Neal, D. J., & Collins, S. E. (2004). A psychometric analysis of the self-regulation questionnaire. *Addictive Behaviors*, 29, 253-260.
- Colder, C. R., & Chassin, L. (1997). Affectivity and impulsivity: Temperament risk for adolescent alcohol involvement. *Psychology of Addictive Behavior*, 11, 83-97.
- Colman, B., Hardy, S. A., Albert, M., Raffaelli, M., & Crockett, L. (2006). Early predictors of selfregulation in middle childhood. *Infant and Child Development*, 15, 421-437.
- Compas, B.E., Connor-Smith, J.K., Saltzman, H., Thomsen, A. H., & Wadsworth, M.E. (2001). Coping with stress during childhood and adolescence: problems, progress, and potential in theory and research. *Psychological bulletin*, 127 (1), 87-127.
- Conrad, K. M., Flay, B. R., & Hill, D. (1992). Why children start smoking cigarettes: Predictors of onset. *British Journal of Addiction*, 87, 1711-1724.
- Crockett, L. J., Raffaelli, M., & Shen, Y. L. (2006). Linking self-regulation and risk proneness to risky sexual behavior: Pathways through peer pressure and early substance use. *Journal of Research on Adolescence*, 16 (4), 503-525.
- Demetriou, A. (2000). Organization and development of self-understanding and self-regulation. In M. Boekaert, P.P. Pintrich & M. Zeidner (Ed), *Handbook of self-regulation* (pp. 209-251). Academic Press: San Diego.
- Dias, P. C., Garcia del Castillo, J. A., & Schwarzer, R. (2008). Estudo de adaptação da Escala de Auto-Regulação (Schwarzer, Diehl, & Schmitz, 1999) para a população Portuguesa. *Actas da XIII Conferência Internacional de Avaliação Psicológica*. Braga: Psiquilíbrios Edições.
- Dishion, T. J., Capaldi, D. M., Spracklen, K. M., & Li, F. (1995). Peer ecology of male adolescent drug use. *Development and Psychopathology*, 7, 803-824.
- Eiden, R. D., Edwards, E. P., & Leonard, K. E. (2007). A conceptual model for the development of externalizing behavior problems among kindergarten children of alcoholic families: Role of parenting and children's self-regulation. *Developmental Psychology*, 43, 1187-1201.
- Eiden, R. D., Leonard, K. E., Hoyle, R. H., & Chavez, F. (2004). A transactional model of parent-infant interactions in alcoholic families. *Psychology of Addictive Behaviors*, 18, 350-361.

Limitations and future research lines

Despite the fact that in the course of the whole research project we used two different samples, with a view to the theoretical improvement of validity and reliability, the convenience-based recruitment approach does constitute a limitation. Therefore, looking to the future and the possibilities of exploring in more depth the reciprocal relationship tentatively posited between self-regulation and substance use, it would be advantageous to use larger, more varied samples, as well as longitudinal designs that would permit the study of changes in the same individuals over a longer period of time.

- Eiden, R.D., Chavez, F. & Leonard, K. (1999). Parent-Infant interactions among alcoholic families. *Journal of Development and Psychopathology*, *11*, 745-762.
- Eisenberg, N., & Fabes, R. A. (1998). Prosocial development. In W. Damon & N. Eisenberg (Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th Ed., pp. 701-778). New York: Wiley.
- Eisenberg, N., Sadovsky, A., Spinrad, T.L., Fabes, R.A., Losoya, S.H., Valiente, C., Reiser, M., Cumberland, A. & Shepard, S.A. (2005). The relations of problem behavior status to children's negative emotionality, effortful control, and impulsivity: Concurrent relations and prediction of change. *Developmental Psychology*, *41* (1), 193-211.
- Espada, J. P., Méndez, F. X., Griffin, K. W., & Botvin, G. J. (2003). Adolescencia: consumo de alcohol y otras drogas. *Papeles del Psicólogo*, *84*, 9-17.
- Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A Framework for Understanding Healthy Development in the Face of Risk. *Annual Review of Public Health*, *26*, 399-419.
- Finkenauer, C., Engels, R. C., & Baumeister, R. F. (2005). Parenting and adolescent externalizing and internalizing problems: The role of self-control. *International Journal of Behavioral Development*, *29*, 58-69.
- Frydenberg, E. & Lewis, R. (1994). Coping with different concerns: Consistency and variation in coping strategies used by adolescents. *Australian Psychologist*, *29*, 45-48.
- García del Castillo, J. A., & Dias, P. (2007). Análisis relacional entre los factores de protección, resiliencia, autorregulación y consumo de drogas. *Salud y Drogas*, *7* (2), 309-332.
- García del Castillo, J. A., & Dias, P. C. (2009). Auto-regulação e consumo de substâncias na adolescência. In A. Maia, S. Silva & T. Pires (Orgs.), *Actas do 1º Congresso de Saúde e Comportamento dos países de Língua Portuguesa* (pp. 117-127). Braga: CIPSI Edições.
- Gestsdottir, S., & Lerner, R. M. (2008). Positive development in adolescence: The development and role of intentional self regulation. *Human Development*, *51*, 202-224.
- Gibbons, F. X., Gerrard, M., Reimer, R. A., & Pomery, E. A. (2006). Unintentional behavior: A subrational approach to health risk. In D. Ridder & J. de Wit (Eds.), *Self-regulation in Health Behavior* (pp. 45-70). Chichester: John Wiley & Sons.
- Graham, J., Marks, G., & Hansen, W. (1991). Social influence processes affecting adolescent substance use. *Journal of Applied Psychology*, *16* (2), 291-298.
- Greenberg, G., Partridge, T., Mosack, V. & Lambdin, C. (2006). Psychology is a developmental science. *International Journal of Comparative Psychology*, *19* (2), 185-205.
- Grolnick, W.S. & Farkas, M. (2002). Parenting and the development of self-regulation. In M.H. Bornstein (Ed.), *Handbook of parenting: Vol. 5: Practical issues in parenting* (pp. 89-110). Hillsdale, NJ: Erlbaum.
- Grusec, J. E., & Goodnow, J. J. (1994). Impact of parental discipline methods on the child's internalization of values: A reconceptualization of current points of view. *Developmental Psychology*, *30*, 4-19.
- Harakeh, Z., Engels, R. C. M. E., Vermulst, A. A., De Vries, H., & Scholte, R. H. (2007). Best friends, siblings and adolescents' smoking. *Psychology & Health*, *22*, 269-289.
- Holden, E. W., & Nitz, K. (1995). Epidemiology of adolescent health disorders. In J. L. Wallander & L. J. Siegel (Eds.), *Adolescent health problems: Behavioral perspectives* (pp. 7-21). New York: Guilford Press.
- Hoyle, R. H. (2008). Structural equation modeling in abnormal and clinical psychology research. In D. McKay (Ed.), *Handbook of research methods in abnormal and clinical psychology* (pp. 235-252). Thousand Oaks, CA: Sage Publications.
- Husman, J., & Lens, W. (1999). The role of the future in student motivation. *Educational Psychologist*, *34* (2), 113-125.
- Kandel, D.B. (1996). Epidemiological trends and implications for understanding the nature of addiction. In C.P. O'Brien & J.H. Jaffe (Eds.), *Addictive States* (pp. 23- 40). New York: Raven Press.
- Karoly, P., Ruelhman, L. S., Okun, M. A., Lutz, R. S., Newton, C., & Fairholme, C. (2004). Perceived self-regulation of exercise goals and interfering goals among regular and irregular exercisers: A life space analysis. *Psychology of Sport and Exercise*, *6*, 427-442.
- Karremans, A., van Tuijl, C., van Aken, M.A., & Deković, M. (2006). Parenting and self-regulation in preschoolers: A Meta-analysis. *Infant and Child Development*, *15*, 561-579.
- Kochanska, G., & Knaack, A. (2003). Effortful control as a personality characteristic of young children: Antecedents, correlates, and consequences. *Journal of Personality*, *71*, 1087-1112.
- Kochanska, G., Murray, K., & Coy, K. C. (1997). Inhibitory control as a contributor to conscience in childhood: From toddler to early school age. *Child Development*, *68*, 263-277.
- Kochanska, G., Murray, K., Jacques, T., Koenig, A. L., & Vandegeest, K. (1996). Inhibitory control in young children and its role in emerging internalization. *Child Development*, *67*, 490-507.
- Kochanska, G., Murray, K.T., & Harlan, E. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology*, *36*, 220-232.
- Kopp, C. B. (1982). Antecedents of self-regulation: a developmental perspective. *Developmental Psychology*, *18*, 199-214.
- Krueger, R. F., Caspi, A., Moffitt, T. E., White, J., & Stouthamer-Loeber, M. (1996). Delay of gratification, personality and psychopathology: Is low self-control specific to externalizing problems? *Journal of Personality*, *64*, 107-129.
- Lamborn, S. D., Mounts, N. S., Steinberg, L., & Dornbusch, S. M. (1991). Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent, and neglectful families. *Child Development*, *62*, 1049-1065.
- Lengua, L. J. (2003). Associations among emotionality, self-regulation, adjustment problems and positive adjustment in middle childhood. *Journal of Applied Developmental Psychology*, *24*, 595-618.
- MacDonald, A., & Palfai, T. (2008). Predictors of exercise behavior among university student women : Utility of a goal-systems/self-regulation theory framework. *Personality and Individual Differences*, *44*, 921-931.
- Maes, S., & Karoly, P. (2005). Self-Regulation Assessment and Intervention in Physical Health and Illness: a Review. *Applied Psychology, an International Review*, *54* (2), 267-299.
- Martin, J., & McLellan, A. (2008). The Educational Psychology of Self-Regulation: A Conceptual and Critical Analysis. *Studies in Philosophy and Education*, *27* (6) 433-448.
- McCabe, L. A., & Brooks-Gunn, J. (2007). With a little help from my friends?: Self-regulation in groups of young children. *Infant Mental Health Journal*, *28*, 584-605.
- Meece, J. L., & Painter, J. (2008). The motivational roles of cultural differences and cultural identity in self-regulated learning. In D. H. Schunk & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (pp. 339-367). Mahwah, NJ: Erlbaum.
- Mischel, W., Shoda, Y., & Rodriguez. (1989). Delay of gratification in children. *Science*, *244*, 933-938.
- Moilanen, K. L. (2007a). The Adolescent Self-Regulatory Inventory: The development and validation of a questionnaire of short-term and long-term self-regulation. *Journal of Youth and Adolescence*, *36* (6), 835-848.
- Moilanen, K. (2007b). *The Adolescent Self-Regulatory Inventory Packet*. Unpublished manuscript. Nebraska: Nebraska University.
- Moilanen, K., García del Castillo, J.A., & Dias, P.C. (2009). *The Adolescent Self-Regulatory Inventory Packet v.2*. Unpublished manuscript. Virginia: West Virginia University.
- Muñoz-Rivas, M., Andreu, J.M., & Gutierrez, P. (2005). Genero y continuidad en el consumo de alcohol, tabaco y cannabis en jóvenes. *Salud y Drogas*, *5* (2), 67-79.
- Neal, D. J., & Carey, K. B. (2005). A Follow-Up Psychometric Analysis of the Self-Regulation Questionnaire. *Psychology of Addictive Behaviors*, *19* (4), 414-422.
- Newman, D.L., Caspi, A., Moffitt, T.E., & Silva, P.A. (1997). Antecedents of adult interpersonal functioning: effects of individual differences in age 3 temperaments. *Developmental Psychology*, *33*, 206-217.
- Novak, S. P., & Clayton, R. R. (2001). The influence of school environment and self-regulation on transitions between stages of cigarette smoking. *Health Psychology*, *20*, 196-207.
- Oetting, E. R., & Beauvais, F. (1987). Peer cluster theory, socialization characteristics, and adolescent drug use: A path analysis. *Journal of Counseling Psychology*, *34*, 205-213.
- Oyserman, D., Terry, K., & Bybee, D. (2002). A possible selves intervention to enhance school involvement. *Journal of Adolescence*, *25* (3), 313-326.

- Post, Y., Boyer, W., & Brett, L. (2006). A historical examination of self-regulation: helping children now and in the future. *Early Childhood Education Journal*, 34 (1), 5-14.
- Raffaelli, M., & Crockett, L. J. (2003). Predicting sexual risk-taking: The role of self-regulation and attraction to risk. *Developmental Psychology*, 39, 1036-1046.
- Rigby, K. & Slee, P.T. (1993). Children's attitudes towards victims. In D. P. Tattum (ed) *Understanding and Managing Bullying* (pp.119-135). Melbourne: Heinemann Books.
- Shoda, Y., Mischel, W., & Peake, P. K. (1990). Predicting adolescent cognitive and social competence from preschool delay of gratification: Identifying diagnostic conditions. *Developmental Psychology*, 26, 978-986
- Shulman, S., Carlton-Ford, S., Levian, R., & Hed, S. (1995). Coping styles of learning disabled adolescents and their parents. *Journal of Youth and Adolescence*, 24, 281-294.
- Sussman, S., Unger, J. B., & Dent, C. W. (2004). Peer group self-identification among alternative high school youth: A predictor of their psychosocial functioning five years later. *International Journal of Clinical and Health Psychology*, 4, 9-25.
- Tangney, J.P., Baumeister, R.F., & Boone, A.L. (2004). High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success. *Journal of Personality*, 72, 271-324.
- Teixeira, M. A., Oliveira, A. M., & Wottrich, S. H. (2006). Escalas de Práticas Parentais (EPP): Avaliando dimensões de práticas parentais em relação a adolescentes. *Psicologia, Reflexão e Crítica*, 19, 433-441.
- Vondra, J. I., Shaw, D. S., Swearingen, L., Cohen, M., & Owens, E. B. (2001). Attachment stability and emotional and behavioral regulation from infancy to preschool age. *Development and Psychopathology*, 13, 13-33.
- Weinberg, M. K., Tronick, E. Z., Cohn, J. F., & Olson, K. L. (1999). Gender differences in emotional expressivity and self-regulation during early infancy. *Developmental Psychology*, 35, 175-188.
- Williams, P.G., Holmbeck, G.N., & Greenley, R.N. (2002). Adolescent health psychology. *Journal of Consulting and Clinical Psychology*, 70, 828-842.
- Wills T. A., & Dishion, T. J. (2004). Temperament and Adolescent Substance Use: A Transactional Analysis of Emerging Self-Control. *Journal of Clinical & Adolescent Psychology*, 22 (1) 69-81.
- Wills, T. A., Walker, C., Mendoza, D., & Ainette M. G. (2006). Behavioral and emotional self-control: relations to substance use in samples of middle and high school students. *Psychology of Addictive Behaviors*, 20 (3), 265-278.

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