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RISK PERCEPTION AND STAGES OF SMOKING ACQUISITION
PERCEPCIÓN DE RIESGO Y ETAPAS DE INICIACIÓN EN EL CONSUMO DE TABACO

Sílvia Font-Mayolas[1], Mª Eugènia Gras[1], Montserrat Planes[1], Josefina Patiño [1]
& Mark J.M. Sullman[2]

Centro Interdisciplinario de Investigación en Psicología Matemática y Experimental (CIIPME) - Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) / Universidad Autónoma de Entre Ríos (UADER, Argentina)

Abstract

The purpose of this descriptive survey was to investigate the risk perceptions of smoking in a sample of 1,510 Spanish adolescents (49.1% males; mean age = 14.03; SD = 1.28). In addition, the present research categorised adolescents into one of the four stages of smoking acquisition, as described by the Transtheoretical Model of Change (TMC): Precontemplation (not thinking about trying smoking in the next 6 months), Contemplation (thinking about trying smoking in the next 6 months), Preparation (thinking about starting smoking in the next 30 days) and Action (smokers), by gender and age. The results showed that age and risk perceptions are important variables in the progression through the stages of change towards regular tobacco consumption (Action stage). These results clearly demonstrate the importance of starting anti-smoking campaigns at an early age to prevent smoking acquisition or the thought of starting in the near future. These findings also highlight the need to continuously remind adolescents about the negative consequences of smoking.

Keywords: Risk perception; Stages of acquisition; Tobacco; Spanish adolescents; Survey descriptive study.

Resumen

El objetivo de este estudio descriptivo mediante encuesta fue analizar la percepción de riesgo en cuanto al consumo de tabaco en una muestra de 1,510 adolescentes españoles (49,1% varones; edad media = 14,2, DT = 1,3). Además los adolescentes se clasificaron en una de las cuatro etapas de iniciación al consumo según el Modelo Transteórico de Cambio: Precontemplación (sin intención de consumo en los próximos 6 meses), Contemplación (con intención de consumo en los próximos 6 meses), Preparación (con intención de fumar en el próximo mes) y Acción (fumadores), en función del género y la edad. Además se analizó el riesgo percibido de fumar como indicador del consumo de tabaco. Los resultados muestran que la edad y la percepción de riesgo son factores determinantes en la progresión hacia etapas de cambio más próximas al consumo de tabaco. Se manifiesta la necesidad de aplicar las campañas preventivas del consumo de tabaco desde edades muy tempranas para evitar que los adolescentes se inicien en el consumo o tengan intención de hacerlo, así como de persistir en la información sobre las consecuencias negativas de fumar.

Palabras clave: Percepción de riesgo; Etapas de iniciación; Tabaco; Adolescentes españoles; Estudio descriptivo mediante encuesta.

Correspondencia: Dra. Sílvia Font-Mayolas
Departamento de Psicología.
Universidad de Girona
Plaza Sant Domènec, 9
17071 Girona (España)
E-mail: silvia.font@udg.edu

The *Global Status Report on Non-communicable Diseases* describes tobacco use as one of the main risk factors for cancer, cardiovascular and chronic respiratory diseases, and projects the number of tobacco-related deaths will increase to 8 million by 2030 (World Health Organization, 2010 and 2011). Worryingly, in Spain 26.2% (23.0% boys and 29.3% girls) of adolescents aged between 14 and 18 years old reported having smoked cigarettes during the past 30 days (Ministerio de Sanidad, Política Social e Igualdad, 2011). This same study found that the mean age of tobacco experimentation and daily tobacco use were 13.5 and 14.3 years old, respectively. Furthermore, in a separate sample of Spanish adolescents (aged 12 to 18 years old) Inglés et al. (2007) found that 40.4% had tried smoking at least once in their life, 17.5% had experimented with tobacco and 8.2% smoked regularly.

Perceived risk is considered in several theories of social psychology as a variable that could influence addiction initiation (García del Castillo, 2012). Risk perception has been found to be an indirect predictor of the present and future engagement in drug use, with higher risk perceptions usually being associated with less drug use (Chassin, Presson, Rose, & Sherman, 2001; Williams, Herzog, & Simmons, 2011). In the case of tobacco use, 90.4% (88.9% boys and 91.7% girls) of Spanish adolescents think that smoking 20 cigarettes per day could cause some or substantial health problems (Ministerio de Sanidad, Política Social e Igualdad, 2011). Furthermore, research has also found, in a sample of Spanish adolescents (between 12 and 16 years old), that the perceived risk of harm is significantly related to tobacco use: smokers perceived smoking one pack of cigarettes to be less risky than those who do not smoke (García-Rodríguez, Suárez-Vázquez, Santonja-Gómez, Secades-Villa, & Sánchez-Hervás, 2011). This same study also found a significant relationship between tobacco use and age, such that the probability of smoking increased with age. As García del Castillo (2010) suggested, during adolescence the desire to try new things is strong and may be enough to counteract the perceived risk.

Smoking initiation during adolescence has been characterised by many researchers as the progression through a sequence of stages (Becoña, 2007; Font-Mayolas, 2011; Mayhew, Flay, & Mott, 2000). The Transtheoretical Model of Change (TMC), proposed by Prochaska and DiClemente (1983), was initially used to explain the cessation of smoking by stages and has since also been applied to samples of Spanish smokers (Font-Mayolas, Planes, Gras, & Sullman, 2007; Morales, Pascual, & Carmona, 2010; Suñer-Soler et al., 2012). Moreover, the TMC has also been adapted to the acquisition of smoking by Stern, Prochaska, Velicer, & Elder (1987). These authors differentiate between four stages in the acquisition process: precontemplation (not yet beginning to think about smoking, and/or have no desire to start smoking in the future); contemplation (thinking about starting to smoke); action (have begun to experiment with cigarettes and are deciding whether or not it is for them); and maintenance (smoking on a regular basis and being committed to smoking now and in the future). Several studies have also used the TMC to study the initiation of smoking in North American, Asian and European adolescents with the following stages: precontemplation (not thinking about trying smoking in the next 6 months), contemplation (thinking about trying smoking in the next 6 months), preparation (thinking about starting smoking in the next 30 days) and action (regularly smoking) (Chen, Horner, Percy, & Sheu, 2008; Pallonen, Prochaska, Velicer, Prokhorov, & Smith, 1998; Plummer et al., 2001; Velicer, Redding, Anatchkova, Fava, & Prochaska, 2007).

Plummer et al. (2001) found a relationship between the stages of acquisition and the perceived cons or negative consequences of tobacco smoking. In other words, the perceived cons of smoking decreased from the Precontemplation stage to the Preparation stage of acquisition. Furthermore, research using a sample of European adolescents found that those who intended to start smoking within the next five years reported less negative consequences of smoking than those definitely not intending to smoke in the future (Kremers, Mudde & de Vries, 2001).

In previous research, risk perceptions have been used to compare adolescent smokers with adolescent nonsmokers (García-Rodríguez et al., 2011; Williams et al., 2011). However, in the present study perceived risk has been used to investigate differences according to the stage of smoking acquisition. This new approach could help in the development of interventions targeted specifically at Spanish adolescents' close to, or even a long way from, beginning to smoke.

The main goal of this descriptive survey was to examine the perceived risks of smoking in a sample of Spanish adolescents, according to age and gender. Based on previous literature, it was hypothesized that perceived risk would decrease with age. A second goal of the research was to determine the stage of smoking acquisition using the transtheoretical model of change and to investigate its relationship to age and the perceived risks associated with smoking. It was predicted that Spanish adolescents in the Precontemplation stage would report higher risk perceptions than those in the more advanced stages. Moreover, it was hypothesized that age would be the most important factor (of those measured) in the progression through the stages of acquisition.

METHOD

Participants

As the study was investigating the experimentation and initiation of smoking in adolescence, the study population consisted of all secondary students from all public high schools in the city of Girona (Spain). This saturation sample resulted in

an initial sample of 1881 participants, but 371 (19.7%) were excluded due to missing data or erroneous responses. The final sample consisted of 1510 secondary students (50.90% female) aged between 12 and 17 years old (mean age = 14.03, SD = 1.28). Ethnicity was not assessed.

Instruments and variables

Participants were asked to complete a short questionnaire which measured the following variables:

- Demographic information (e.g., age, gender).
- Perceived risk of smoking - Participants were asked how risky they perceived regular smoking to be. This was answered on a five point Likert-scale, which ranged from 0 (Not dangerous at all) to 4 (Very dangerous) (García del Castillo & Cordeiro, 2009; Megías, Rodríguez, Megías, & Navarro, 2005).
- Stage of smoking acquisition - Participants were asked if they were thinking about trying or planning to try smoking within the next 30 days (Preparation stage), or 6 months (Contemplation stage); or whether they had been smoking regularly (Action stage). If participants reported that they were not thinking of trying smoking in the next 6 months, they were categorised as being in the Precontemplation stage (Pallonen et al., 1998).

Procedure

The study was firstly authorized by the Catalan Ministry of Education in Barcelona, Spain. Following this, the research was then explained to the principals of all high schools in Girona and permission to conduct the research was sought. All of the principals agreed to take part. The research was then described to all teachers involved, who in turn explained the research to the parents of all children and asked permission for their child/children's participation. As well as the aims of the research, and what participation would involve, the parents were told that their child/children's participation was entirely voluntary and that responses would be completely confidential and anonymous. Despite participation being completely voluntary, all parents agreed to their children taking part in the study and so all children who were in class on the day of data collection were surveyed.

Design

According to the classification system proposed by Montero and León (2007), a descriptive survey was carried out.

Data analysis

Chi-Squared tests were used to study the relationship between categorical variables. Non parametric Kruskal-Wallis tests were used to compare risk perceptions between ages and according to the stage of change, while non-parametric contrasts were undertaken using Mann-Whitney tests. All tests were conducted using SPSS version 19.

RESULTS

Table 1 shows the participant's age and gender. Most participants were between 13 and 16 years old (86.8%: 86.2% boys and 87.2% girls). Boys had a slightly lower mean age (mean = 14.13 years; SD = 1.28) than girls (mean: 14.25 years; SD = 1.28), but this difference was not statistically significant (t= -1.81; p= 0.07). Students' distribution by academic year was: 22.2% first, 21.8% second, 27.3% third and 28.7% fourth year.

Table 1: Distribution of participants by age and gender n (%)

	12 years	13 years	14 years	15 years	16 years	17 years	Total
Boys	89 (12.0)	155 (20.9)	188 (25.4)	198 (26.7)	98 (13.2)	13 (1.8)	741 (49.1)
Girls	78 (10.1)	150 (19.5)	195 (25.4)	215 (28.0)	110 (14.3)	21 (2.7)	769 (50.9)
Total	167 (11.1)	305 (20.2)	383 (25.4)	413 (27.4)	208 (13.8)	33 (2.2)	1510 (100)

Table 2 shows the mean smoking risk perception by age and gender. Overall the mean smoking risk perception decreased with age from 12 to 16 years old, but appeared to increase again at 17 years old. A non-parametric Kruskal-Wallis test found significant differences in smoking risk perception by age in both boys ($X2(5) = 38.3$; $p<.0005$) and girls ($X2(5) = 14.2$; $p=.01$). Furthermore, the Mann-Whitney contrasts found that the significant differences in smoking risk perception were between the 12 to 13-years-olds and the 14 to 16-years-old adolescents ($z = 3.3$; $p=.001$). Although smoking risk perception increased again at 17-years-old, this difference was only significant amongst male adolescents ($z = 2.3$; $p=.04$).

Table 2: Means and standard deviations of smoking risk perception* by age and gender

	12 years	13 years	14 years	15 years	16 years	17 years	Total
Boys Mean (SD)	3.7 (1.0)	3.6 (1.0)	3.2 (1.0)	3.1 (1.0)	3.1 (1.0)	3.7 (1.1)	3.3 (1.1)
Girls Mean (SD)	3.5 (1.0)	3.4 (1.2)	3.2 (1.1)	3.1 (1.0)	3.1 (1.2)	3.2 (.9)	3.2 (1.1)
Total	3.6 (1.0)	3.5 (1.2)	3.2 (1.1)	3.1 (1.0)	3.1 (1.0)	3.4 (1.0)	3.3 (1.1)

* From 0 = "Not dangerous at all" to 4 = "Very dangerous"

The percentage of adolescents by stage of smoking acquisition, age and gender is shown in Table 3. Most of the adolescents were in the Precontemplation stage, while very few were in the Contemplation and Preparation stages. Furthermore, as age increased so too did the proportion of adolescents in the stages closer to smoking acquisition (the Action stage). The same trend was observed in both girls and boys, when they were analysed separately. Due to the small number of adolescents in the Contemplation and Preparation stages, these were joined in order to meet the minimum cell sizes for the Chi-squared tests.

Significant differences by age were found in the whole sample (X2(10) = 133.3; p<.0005). Although more girls than boys were in the Action stage, and more boys than girls in the Precontemplation stage, these differences did not reach statistical significance (X2(2) = 5.7; p=.06). Nevertheless, when we compared the percentage of smokers by gender, significantly more girls (21.1%), than boys (16.3%), smoked (X2(1) = 5.6; p=.02). However, there was no gender difference in the mean age at which they became regular tobacco consumers (Mean age boys = 13.2; SD = 1.7; Mean age girls = 13.4; SD = 1.3; t = .77; p=.44).

Table 3. Stage of smoking acquisition by age and gender (percentages).

Stage of acquisition		12 years n = 166	13 years n = 305	14 years n = 383	15 years n = 413	16 years n = 208	17 years n = 34	Total
Precontemplation	Boys	95.5	89.7	77.7	66.7	65.3	61.5	77.5
	Girls	93.5	90.7	74.4	61.9	62.7	42.9	73.4
Contemplation	Boys	2.2	1.9	2.1	6.1	7.1	15.4	4
	Girls	1.3	0	7.2	4.2	3.6	19	4.2
Preparation	Boys	0	2.6	2.7	3.5	0	0	2.2
	Girls	1.3	1.3	1.5	1.9	0	0	1.3
Action	Boys	2.2	5.8	17.6	23.7	27.6	23.1	16.3
	Girls	3.9	8	16.9	32.1	33.6	38.1	21.1

Table 4 presents smoking risk perception by stage of change and gender. Smoking risk perception decreased as the adolescent progressed through the stages of change (i.e. the closer to the Action stage, the lower the risk perceived). A non-parametric Kruskall-Wallis test identified significant differences (X2(3) = 122.5; p<.0005), while the Mann-Whitney contrasts found significant differences between adolescents in the Precontemplation stage and those in any other stage (PC vs. C: z = -3.2; p=.001; PC vs. Pre: z = -3.46; p<.0001; PC vs. A: z = -10.5 p<.0005). However, no differences were found between the Contemplation, Preparation and Action stages (C vs. Pre: z = -1.6, p = .12; C vs. A: z = 1.5, p = .11; Prep vs. A: z = -.3, p =.77). The same pattern was also found when boys and girls were analysed separately.

Table 4: Means and standard deviations of smoking risk perception* by stage of acquisition and gender

	Precontemplation	Contemplation	Preparation	Action
Boys Mean (SD)	3.4 (1.0)	3.1 (.9)	2.7 (1.1)	2.8 (1.0)
Girls Mean (SD)	3.4 (1.0)	2.9 (.9)	2.5 (1.4)	2.6 (.9)
Total	3.4 (1.0)	3.0 (.9)	2.7 (1.2)	2.7 (1.0)

* From 0 = "Not dangerous at all" to 4 = "Very dangerous"

DISCUSSION

The first goal of this study was to examine Spanish adolescents' risk perceptions regarding smoking, according to age and gender. As hypothesized, these results supported the fact that the perceived risk of smoking decreased from age 12 to 16 years old. Also García-Rodríguez et al. (2011) found that the probability of smoking increased with age in a sample of Spanish adolescents. Previous research has also reported this pattern of findings and suggests this may be due to an increased interest in trying new things and also their perceptions of invulnerability (García del Castillo, 2012). Therefore, our results highlight the need for interventions to increase adolescents' knowledge of the physical, psychological and social risks of smoking in order to maintain this high risk perception as long as possible. Although it is not easy to increase risk perceptions surrounding smoking, as García del Castillo (2012) proposed, research on this topic must continue. Furthermore, it would be interesting to thoroughly investigate the apparent recovery of age as a protective factor, in terms of risk perceptions (García de Castillo, 2010), among older adolescent males.

A second goal of this research was to identify the stage of smoking acquisition using the transtheoretical model of change and its relationship to the perceived risks of smoking and age. Most of the Spanish adolescents in the present sample were categorised as being in the Precontemplation stage (77.5% boys and 73.4% girls), in other words they had no intention to start smoking in the near future. This finding is in agreement with previous studies among Asian, European and North-American adolescents (Chen et al., 2008; Kremers et al., 2001; Velicer et al., 2007).

The results of this study demonstrate that the perceived risk of smoking was strongly related to the stage of acquisition. As predicted, those who were not smokers and were not thinking about consuming in the near future perceived a higher risk of smoking than current smokers (Action stage) and those who were thinking about starting smoking in the near future (Contemplation and Preparation stages). A strong relationship has also found between adolescent tobacco (and other drugs) consumption and perceived risk (e.g. Moral & Ovejero, 2009), including among university students (Precioso & Macedo, 2008). Previous research has also found less negative consequences of smoking reported by those who have an intention to start smoking (Kremers et al., 2001; Plummer et al., 2001). Moral & Ovejero (2009) hypothesised that this is due to consumers (and those with a future intention to smoke) distorting their perceived risk of smoking, which they called the user mentality. Unfortunately, due to the cross-sectional nature of the present research it is not possible to identify the direction of the relationship. In other words, whether it is those with a higher perceived risk who are less likely to start smoking or whether smokers distort their risk perceptions, as Moral & Ovejero (2009) suggest. Longitudinal research is needed to clarify this point. Furthermore, it would be interesting to investigate the development of risk perceptions over time. In particular, it would be extremely interesting to find out whether the changes in risk perceptions come before or after stage advancement.

As hypothesized, age was the determinant factor in the progression through the stages of change towards regular smoking among these school students, with no differences by gender. As well as becoming a regular smoker, thinking about starting to smoke also increased with age. There was also a gender effect, with more girls being categorised as smokers than boys. This finding is also in agreement with the last Spanish national survey on drug consumption among secondary school students and other previous studies (Ministerio de Sanidad, Política Social e Igualdad, 2011; Ramos & Moreno, 2010).

The most vulnerable ages for starting tobacco consumption were 14 and 15 years old, with very few adolescents starting to smoke before 14 years old, while the percentage of consumers remained relatively stable after 15 years old. Nevertheless, almost 2 out of 10 adolescents aged 17 years old were thinking about starting smoking in the near future. Similar results were also found by Moral & Ovejero (2009) in a sample of Spanish adolescents aged between 12 and 16 years old. They found that 1.9% of 12-year olds and 5.4% of 13-year old adolescents smoked every day, but that this figure increase to 9.8% at 14 and to 15.6% at 15 years old. Moreover, in a longitudinal study of a sample of Spanish adolescents Oliva, Parra, & Sánchez-Queija (2008) found that most participants started smoking between 13 and 15 years old.

There were no gender differences in the mean age at which the students started regularly smoking. This finding is in agreement with previous research which has found that adolescent female consumption has been progressively increasing to the same level, or higher, than that of adolescent males (Mendoza, López, & Sagrera, 2007; Ministerio de Sanidad, Política Social e Igualdad, 2011).

As this study shows that a substantial proportion of the adolescents had tried smoking by the age of 14 years old, it is important that smoking prevention interventions are implemented before this age. Moreover, it would make sense to take advantage of the fact that most adolescents reported no intention to smoke in the near future, in order to reinforce the beliefs, attitudes and behaviours that help to maintain the intention to not start smoking. This should involve attempting to promote effective coping strategies, tailored according to age and gender, using classroom-based interventions, community-based strategies and anti-smoking policy measures aimed at reducing the amount of smoking in movies and on television (Ariza & Villalbí, 2004; Glantz, 2012; Gómez-Fraguela, Luengo-Martín, Romero-Triñanes, Villar-Torres, & Sobral-Fernández, 2006).

As with all survey-based research, there are a number of possible limitations to this study. As all the participants were in Girona, it is possible that they differ significantly from the general population of Spanish adolescents. Therefore, future research should be conducted elsewhere in Spain to confirm these findings. Another possible limitation is that the data were obtained using self-reports, which may be vulnerable to social desirability bias. However, voluntary participation, assurances of confidentiality and the use of anonymous questionnaires will have reduced the impact of social desirability bias. Finally, due to the cross-sectional nature of the study the conclusions made here are limited to demonstrating relationships rather than causation.

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