UNIVERSIDAD MIGUEL HERNÁNDEZ

Programa de Doctorado de Deporte y Salud

TESIS DOCTORAL

Evaluación de un programa de prevención y tratamiento del tabaquismo en adolescentes

Doctoranda: Dña. María T. Gonzálvez Maestre
Directores: Dr. José Pedro Espada Sánchez
Dra. Mireia Orgilés Amorós

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Esta tesis doctoral ha sido realizada según la normativa reguladora del 21 de abril, por la que se establece la ordenación de las enseñanzas de doctorado (Real Decreto 99/2011) y la normativa interna para la presentación de tesis doctorales por conjunto de publicaciones de la Universidad Miguel Hernández de Elche. De acuerdo con la normativa de estudios de doctorado, a continuación se detallan las referencias completas de los artículos que constituyen el cuerpo de la presente tesis:

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D. JOSÉ PEDRO ESPADA SÁNCHEZ y Dña. MIREIA ORGILÉS AMORÓS, Profesores Titulares de la Universidad en el Departamento de Psicología de la Salud de la Universidad Miguel Hernández de Elche

CERTIFICAN

Que la presente tesis doctoral, titulada "Evaluación de un programa de prevención y tratamiento del tabaquismo en adolescentes" ha sido realizada por Dña. MARÍA TERESA GONZÁLVEZ MAESTRE bajo nuestra dirección, y a nuestro juicio reúne las condiciones para ser defendida ante el Tribunal correspondiente para optar al grado de Doctor.

Elche, 5 de Octubre de 2016

Fdo: Dr. José Pedro Espada

Fdo: Dra. Mireia Orgilés Amorós

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D. EDUARDO MANUEL CERVELLÓ GIMENO, Coordinador del Programa de Doctorado de Deporte y Salud de la Universidad Miguel Hernández de Elche

INFORMA

Que da conformidad a la lectura y defensa de la Tesis Doctoral presentada por Dña. MARIA TERESA GONZÁLVEZ MAESTRE, titulada "Evaluación de un programa de prevención y tratamiento del tabaquismo en adolescentes".

Y para que conste a los efectos oportunos, emite el siguiente informe en Elche, a cinco de octubre de dos mil dieciséis.

Fdo. Dr. Eduardo Manuel Cervelló Gimeno

Coordinador del Programa de Doctorado de Deporte y Salud

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A mi madre

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UNIVERSITAS
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Índice

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RESUMEN

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La presente tesis doctoral tiene tres objetivos generales: (1) revisar y analizar la eficacia de los programas preventivos de drogas en escolares españoles, (2) profundizar en el conocimiento sobre los factores de riesgo asociados al consumo de tabaco en adolescentes españoles, y (3) evaluar la eficacia de un programa para la prevención y tratamiento del consumo de tabaco en adolescentes españoles y analizar los mediadores de la eficacia del programa.

En primer lugar, se examinaron los programas escolares de prevención de la drogadicción aplicados en España durante el periodo entre 2002 y 2013, con el objetivo de analizar su eficacia y poder cuantificar su eficacia, compararla temporalmente y analizar las estrategias que mejor funcionan.

En segundo lugar, con el fin de aportar nuevos datos sobre los factores de riesgo del tabaquismo adolescente, se examinó el papel de los factores emocionales (estado de ánimo y nivel de ansiedad) como factor de riesgo para el inicio del consumo de tabaco y se analizó su relación con la intensidad del consumo.

En tercer lugar, se adaptó e implementó Proyecto EX, un programa dirigido al cese del consumo de tabaco y se evaluó su eficacia a corto y largo plazo con adolescentes españoles. Asimismo, se analizó el efecto mediador de la dependencia a la nicotina en la eficacia del programa para la reducción del consumo de tabaco. Por último, se adaptó e implementó la versión para el aula de Proyecto EX. Esta modalidad está diseñada como un programa universal para su aplicación en el horario escolar con la participación de todos los alumnos. Se dirige con fines terapéuticos a escolares fumadores y a los no fumadores con fines preventivos. Se presentan aquí datos de la evaluación de su eficacia preventiva a largo plazo.

Estos tres objetivos dan lugar a un total de seis estudios que conforman esta tesis doctoral. A continuación se presenta un resumen de cada uno de ellos.

Estudio 1. Meta-análisis de la eficacia de los programas de prevención escolar del abuso de sustancias en España.

El objetivo de este estudio es analizar cuantitativamente la eficacia de los programas escolares de prevención de drogas en España. Se identificaron 21 estudios publicados entre 2002 y 2013 que cumplieron los criterios de selección y que evaluaban programas de prevención del abuso de drogas en el ámbito escolar en España. La eficacia preventiva de los programas fue baja (d = 0.16), aunque era mayor en las medidas de seguimiento (d = 0.30). Los programas resultaron más eficaces en la modificación de las actitudes hacia las drogas (d = 0.44). Los modelos de educación para la salud (d = 0.48) y aprendizaje social (d = 0.20) resultaron más eficaces, junto con la combinación de soporte oral, escrito y audiovisual del material (d = 0.21) y la implementación de los programas por profesionales y profesorado conjuntamente (d = 0.25). A partir de los resultados es posible determinar la necesidad de evaluaciones más rigurosas de las intervenciones.

Estudio 2. Estado de ánimo y consumo de tabaco en una muestra de adolescentes españoles.

Existen evidencias sobre la relación entre el estado de ánimo y el tabaquismo, aunque los resultados no son concluyentes y se desconoce el grado en que esta variable predice el consumo de tabaco en adolescentes españoles. El objetivo de este estudio fue comparar el estado de ánimo entre adolescentes fumadores y no fumadores, y comprobar si los fumadores presentan mayor intensidad de consumo de tabaco con un peor estado anímico. Se reclutó una muestra de 1,507 adolescentes españoles entre 14 y 19 años (M = 15.28; DT = 1.20). Se evaluaron variables sociodemográficas y estado de ánimo mediante la versión breve del 20-item Center for Epidemiologic Studies Depression Scale (CED-D), y la frecuencia de consumo de tabaco mediante un autoinforme. Los adolescentes fumadores presentaron peor estado de ánimo que los no fumadores. Se halló una mayor probabilidad de ser fumador cuando existe un bajo estado de ánimo (B = 1.17; p < .001). Los fumadores (n = 487) fueron clasificados en función del estado de ánimo: bajo (n = 51), medio (n = 97) y alto (n = 339). Los adolescentes con bajo estado de

ánimo presentaron mayor consumo diario de cigarrillos en comparación con aquéllos con mejor estado anímico. Los fumadores con mejor estado de ánimo tenían una pauta de consumo de menor intensidad. Se aportan nuevas evidencias sobre el papel del estado de ánimo depresivo como factor de riesgo para el inicio del consumo de tabaco en adolescentes, comprobando su relación con una intensidad de consumo mayor.

Estudio 3. Estudio piloto de evaluación de Proyecto EX para el cese del consumo de tabaco con adolescentes españoles.

Hasta el momento no existen programas basados en la evidencia para dejar de fumar para adolescentes en España. En este estudio se describe la evaluación de Proyecto EX, un programa escolar para el cese del consumo de tabaco que consta de ocho sesiones, implementado a fumadores españoles entre 13 y 19 años de 9 centros escolares (cuatro centros en la condición experimental y cinco centros en la condición control). Se utilizó un ensayo controlado de grupo aleatorio. Al incio del estudio había 211 fumadores (112 en el grupo experimental y 99 en el grupo control). La medición consistió en una evaluación pretest y postest inmediato (administrado cinco semanas más tarde) y un seguimiento a seis meses (después del postest inmediato). En el postest, Proyecto EX redujo significativamente las puntuaciones en dependencia a la nicotina (mFTQ; $p < .001$), incrementó la intención de dejar de fumar ($p < .001$) y dio lugar a una tasa de abandono ($p < .03$) en el consumo de tabaco (el día anterior a la evaluación). A los seis meses de seguimiento, el porcentaje de exfumadores en el grupo experimental fue del 14.28%, mientras que ningún fumador abandonó el consumo en el grupo control ($p < .04$). Proyecto EX tuvo una influencia significativa en la expectativa futura de fumar ($p = .006$) y en el consumo de tabaco en los últimos 30 días. Los resultados de Proyecto EX en su versión clínica son prometedores para los adolescentes fumadores en España, a pesar de las dificultades en el reclutamiento de la muestra y la alta diserción, motivos de preocupación. Se discuten los hallazgos y limitaciones y se proponen sugerencias para futuras investigaciones.

Estudio 4. Efectos a un año de Proyecto EX: Un programa piloto para la intervención en el consumo de tabaco con adolescentes españoles.

El consumo de tabaco en adolescentes es un problema importante de salud pública, lo que ha llevado al desarrollo de programas para el abandono del consumo como Proyecto EX. Sin embargo, no existen evidencias de la eficacia a largo plazo del cese del consumo entre adolescentes españoles. Este estudio proporciona una evaluación de segumiento a un año del programa Proyecto EX para el cese del consumo de tabaco en 211 fumadores. La tasa de abandono en los últimos 30 días para el grupo experimental fue del 7.81% (p = .04), mientras que en el grupo control ningún fumador abandonó el consumo (p = .02). La intervención tuvo una influencia significativa en las expectivas futuras de fumar, la intención, la motivación para dejarlo y el consumo en los últimos 30 días. Los resultados a largo plazo del programa Proyecto EX en su versión clínica son prometedores para los adolescentes fumadores en España.

Estudio 5. Dependencia a la nicotina como variable mediadora de los efectos de Proyecto EX para reducir el consumo de tabaco en escolares.

A pesar de que algunas intervenciones escolares para el abandono y la prevención del consumo de tabaco han demostrado ser eficaces, existe una falta de comprensión de por qué estos programas tienen éxito o fracasan. Este estudio longitudinal tiene como objetivo poner a prueba el papel de la dependencia a la nicotina como mediadora de los efectos de Proyecto EX, un programa para reducir el consumo de tabaco para jóvenes en edad escolar. Seis centros de educación secundaria ubicados en la costa mediterránea fueron asignados al azar para su participación en el programa (versión española de Proyecto EX) o en lista de espera, con línea base, postest inmediato y evaluación de seguimiento a los 12 meses. En la línea base, 1,546 adolescentes entre 14 y 21 años (edad media: 15.28; DT = 1.20; 46% mujeres) fueron evaluados mediante cuestionarios sobre el consumo de tabaco y dependencia a la nicotina. Se utilizó además un biomarcador del consumo de tabaco, una medición del monóxido de carbono en aire espirado. Para este estudio se seleccionó a los participantes fumadores (N = 501; 32%). Los

análisis de mediación se realizaron usando PROCESS v2.12 para Windows. El criterio de significación fue $p \leq .05$ y se emplearon 5,000 muestras para los intervalos de confianza de sesgo corregido. Los resultados indicaron que Proyecto EX reduce indirectamente el número de cigarros fumados en el último mes, el número de cigarros fumados en los últimos 7 días, el número de cigarros diarios y el nivel de monóxido de carbono en aire espirado a los 12 meses de seguimiento a través de la disminución de la dependencia a la nicotina a corto plazo. Éste es el primer estudio español que explora la dependencia a la nicotina como variable mediadora de la eficacia a largo plazo de Proyecto EX para la reducción del consumo de tabaco en adolescentes. Los resultados sugieren que las intervenciones que reducen la dependencia a la nicotina a corto plazo tienen mayor probabilidad de éxito para reducir el consumo a largo plazo.

Estudio 6. Evaluación a los 12 meses del programa Proyecto EX para la prevención y tratamiento del tabaquismo en el aula.

El presente estudio presenta los resultados de una evaluación a un año de seguimiento de Proyecto EX, un programa escolar para la prevención y el tratamiento del tabaquismo en escolares. Se realizó un ensayo controlado aleatorizado con 1,546 estudiantes españoles, con la participación de tres centros de educación secundaria en la condición experimental y otros tres centros en la condición control. En comparación con el grupo control, los participantes de la condición experimental presentaron una mayor reducción en la dependencia a la nicotina ($p < .05$) y en los niveles de monóxido de carbono ($p < .001$), así como un menor consumo de cigarros en el último mes ($p = .03$). Los resultados a largo plazo de Proyecto EX son prometedores para la prevención en adolescentes y posiblemente el cese del consumo en España.

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ABSTRACT

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This thesis has three general objectives: (1) revise and analyze the effectiveness of the drug prevention programs among Spanish scholars, (2) analyze risk factors associated with the tobacco consumption in Spanish adolescents, and (3) evaluate the effectiveness of Project Ex for the prevention and cessation of tobacco consumption among Spanish adolescents, and analyze the mediator effect of nicotine dependence on the program effectiveness.

Firstly, school drug prevention programs implemented in Spain and published between 2002 and 2013 were examined, in order to analyze their effectiveness and to have new evidence about the programs that work and to improve those that are being made, in order to optmize resources.

Secondly, the role of emotional variables was examined as a risk factor for smoking initiation in Spanish adolescents, and its relationship to the intensity of consumption was analyzed.

Thirdly, the clinic version of Project EX for the cessation of tobacco consumption was adapted and implemented, and its short and long-term effectiveness among Spanish adolescents was tested. Also, the mediating effect of nicotine dependence on the effectiveness of the program to reduce the tobacco consumption was analyzed. In order to adapt the program to the schoolers curriculum, the mixed versión (preventive-interventive) of Project EX was adapted and implemented for its implementation in the school context, evaluating its long-term preventive effectiveness.

This thesis compiles six studies grouped into the three objectives mentioned above. Then, the studies are summarized separately.

Study 1. Meta-analysis of the effectiveness of school substance abuse prevention programs in Spain.

The aim of this paper is to use a meta-analysis to analyze the effectiveness of school drug prevention programs in Spain. Twenty-one studies that evaluated drug abuse prevention programs in schools, where published between 2002 and 2013, and that met the selection criteria were identified. Preventive program effectiveness was low (d = 0.16), although it was higher at the follow-up (d = 0.30). The programs were most effective in changing attitudes (d = 0.44) towards drugs. The models of health education (d = 0.48) and social learning (d = 0.20) were also very effective, especially in combination with oral, written, and audiovisual support material (d = 0.21) and the implementation of joint programs by health education professionals and factulty members (d = 0.25). Is posible to determine the need for more rigorous evaluations of interventions to establish useful programs.

Study 2. Mood and smoking habits in Spanish adolescents.

Although there is evidence of the relationship between mood and smoking, the results are inconclusive and the extent to which this variable predicts the consumption of tobacco in Spanish adolescents is unknown. The aim of this study was to compare the mood among adolescent smokers and nonsmokers, and check whether smokers show more intensely with a worse mood. A sample of 1,507 Spanish adolescents aged between 14 and 19 years old was selected (M = 15.28; SD = 1.20). Sociodemographic variables were evaluated and mood was assessed using the Brief version of the 20-item Center for Epidemiologic Studies Depression Scale (CED-D), and tobacco behavior ever and during the last month and often through a self-report. Adolescent smokers have a worse mood than nonsmokers. Is more likely to be a smoker when there is a low mood (B = 1.17; p < .001). Smokers (n = 487) were classified depending of their mood: low (N = 51), medium (n = 97) and high (n = 339). Adolescents with a low mood showed a higher daily consumption of cigarettes compared to those with a better mood. Smokers with a better mood had a consumption pattern of lower intensity. New evidence on the role of depressed

mood as a risk factor for the initiation of smoking among adolescents is provided, proven its relation to greater consumption intensity.

Study 3. Pilot clinic study of Project EX for smoking cessation with Spanish adolescents.

So far, there are no evidence-based smoking cessation programs for adolescents in Spain. This study describes the evaluation of Project EX, an eight-session school-based clinic smoking cessation program, with Spanish cigarette smokers 13-19 years of age, from 9 schools (four program condition schools and five control condition schools). A group-randomized controlled trial was used. There were 211 smokers at baseline (112 program group, and 99 control group). Evaluation involved an immediate pretest and posttest survey (administered five-weeks later) and six-month follow-up (after the immediate posttest). At immediate posttest, Project EX significantly reduced future nicotine dependence scores (mFTQ; $p < .001$), and increased intention to quit smoking ($p < .001$), and led to a higher previous day (prior to assessment) quit rate, ($p < .03$). At the six-month follow-up, the percentage of quitters in the program group was 14.28%, whereas no smokers quit smoking in the control group ($p < .04$), and Project EX had a significant influence on future smoking expectation ($p = .006$) and overall level of 30-day smoking. Results for the Project EX school-based clinic are promising for adolescent smokers in Spain, although difficulties in recruitment and high attrition are of concern. Findings and limitations are discussed and suggestions for future research are suggested.

Study 4. One-year effects of Project EX: A smoking intervention pilot program with Spanish adolescents.

Adolescent smoking is a major public health problem, which has led to the development of cessation programs such as Project EX. However, there is no evidence for the long-term efficacy of the Project EX cessation program among Spanish adolescent smokers. This study provides a one-year follow-up evaluation

of the Project EX tobacco use cessation program among 211 smokers. The intent-to treat 30-day smoking quit rates for the program group was 7.81% (p = .04), whereas no smokers quit in the control group (p = .02). The intervention had a significant influence on future smoking expectation, intention, motivation to quit, and the overall level of 30-day smoking. Long-term outcomes of the Project EX clinic-based program are promising for adolescent smokers in Spain.

Study 5. Nicotine dependence as a mediator of Project EX's effects to reduce tobacco use in scholars.

Despite the fact that some school-based tobacco cessation and prevention interventions prove to be effective for their purposes, there is a lack of understanding as to why these programs succeed or fail. This longitudinal study aims to test the nicotine dependence (ND) as a mediator of Project EX's effect – a tobacco-use cessation program developed for high school youth to reduce tobacco consumption in scholars. Six high schools located in the Mediterranean coast were randomized for the participation of the program (Spanish version of Project EX) or a waiting-list group with baseline, immediate-posttest, and 12-month follow-up assessments. At baseline, 1,546 adolescents aged 14-21 years old (mean age: 15.28; *SD* = 1.20; 46% were women) were evaluated by self-administered tests on tobacco consumption and nicotine dependence. A biomarker of smoke inhalation – a measurement of exhaled carbon monoxide (ECM) – was used. Participants who were smokers (*N*= 501; 32%) were selected for this study. Mediation analyses were conducted using the PROCESS v2.12 macro for Windows. The significant criterion was $p \leq .05$, and 5,000 samples were used for bias-corrected bootstrap confidence intervals. Results indicated that Project EX indirectly decreased the number of cigarettes smoked in the last month, the number of cigarettes smoked within the last 7 days, the number of daily cigarettes, and ECM level at 12-month follow up through decreasing the level of ND in the short-term. This is the first Spanish study that explores ND as a mediator of the long-term efficacy of Project EX to reduce tobacco consumption in adolescents. Results suggest that interventions that reduce ND at short-term are more likely to be successful to decrease tobacco use at long-term.

Study 6. One-year effects of Project EX in Spain: A classroom-based smoking prevention and cessation intervention program.

The current study provides a one-year follow-up outcome evaluation of Project EX, an eight-session classroom-based curriculum. The intervention was tested using a randomized controlled trial with 1,546 Spanish students, involving three program and three control schools. Compared to the control condition, the program condition revealed a greater reduction in nicotine dependence ($p < .05$) and CO ppm levels ($p < .001$), and lower consumption of cigarettes at last month ($p = .03$). Long-term outcomes of the Project EX classroom-based program are promising for adolescent prevention and possibly cessation in Spain.

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INTRODUCCIÓN

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La evolución del consumo de sustancias en España ha ido fluctuando en función de las épocas y de los mecanismos que se han puesto en marcha para tratar el problema, que actualmente presenta repercusiones tanto sociales como sanitarias (Fuentes, Alarcón, García y Gracia, 2015; Gómez-Fraguela, Fernández, Triñanes y Luengo, 2008).

El uso y abuso de sustancias adictivas constituye actualmente un fenómeno con consecuencias en la salud de los individuos y su entorno, además de representar un problema sanitario en el ámbito nacional (Garrido, Conde, Álvarez y Millán, 2015). Actualmente las drogas están vinculadas a la cultura del ocio (Espada, Lloret y García del Castillo, 2008). En la Estrategia Nacional sobre Drogas 2009-2016 se concibe el consumo como un problema de salud pública.

El consumo de sustancias en adolescentes

El consumo de sustancias entre adolescentes es un problema complejo vinculado con factores genéticos, legales, normativos, psicológicos, de disponibilidad y sociales (Barboso, Mendes y Barbosa, 2009). Los adolescentes que presentan mayor probabilidad de consumir sustancias son aquellos que están sujetos a determinados factores socioculturales y personales (Álvarez et al., 2013; Jordán, Souza y Pillon, 2009; Lemus et al., 2011).

La adolescencia es la etapa de la vida en la que suele iniciarse en consumo de la mayoría de sustancias (Becoña y Cortés, 2012). El inicio precoz en el consumo de drogas y el uso indebido en la población juvenil española resulta especialmente preocupante y lo convierte en un problema sociosanitario de primera magnitud (Fernández, Jorge y Bejar, 2009).

Las diferentes teorías que explican el consumo de drogas se han centrado fundamentalmente en población adolescente, puesto que suele ser la etapa en la que se inicia el consumo (Giannakopoulos, Panagiotakos, Mihas y Tountas, 2008; Simoes, Batista-Foguet, Matos y Calmeiro, 2007). La adolescencia es un periodo de transición entre la infancia y la adultez en la que el adolescente se siente miembro

y partícipe de una cultura caracterizada por sus propios comportamientos, normas, valores y modas (Buelga y Pons, 2013; Hidalgo, Ceñal y Güemes, 2014). Se trata de un periodo de crecimiento y maduración en el que se producen cambios físicos, intelectuales y afectivos (Gutiérrez y Gonçalves, 2013; Jiménez, 2013). Es el periodo en el que se empiezan a tomar las primeras decisiones independientes y a practicar elecciones (Orcasita y Uribe, 2012). Esto exige a los adolescentes una adaptación a su nueva situación, que generalmente se produce de manera adecuada y satisfactoria, aunque no por ello exenta de desequilibrios y conflictos. Se ha de entender la adolescencia como un periodo en el que se configura la personalidad y se dan una serie de factores de riesgo para la salud (González, Ortega, Sanchez, Martínez y Sánchez, 2016). En el contexto evolutivo y social de la adolescencia se desarrollan unas expectativas hacia el consumo que actuarán como predisponentes del mismo (Aldridge, Measham y Williams, 2013).

Los datos de la última encuesta ESPAD, European School Survey Project on Alcohol and Other Drugs (Hibell et al., 2012) muestran que en Europa el 57% de los jóvenes han consumido alcohol en los últimos 30 días y el 12% han realizado su primer consumo antes de los 13 años. En cuanto al consumo de tabaco, el 54% de los jóvenes europeos de 15 años ha probado el tabaco y más de la mitad de estos (51.85%) informan de haber fumado en los últimos 30 días.

En España, las drogas consumidas con mayor frecuencia por los adolescentes entre 14 y 18 años son el alcohol (81.9%) y el tabaco (35.3%), con mayor prevalencia entre las mujeres (PNSD, 2013). Según la última encuesta sobre el uso de drogas en estudiantes de educación secundaria (ESTUDES, 2014), la edad media de inicio en el consumo se sitúa entre los 13 y los 16 años y las prevalencias de consumo son mayores entre los que perciben un mayor número de amigos-iguales consumidores.

Estrategias preventivas

Entre los principales motivos para la prevención del consumo en niños y adolescentes se encuentra reducir el número de futuros adultos con problemas de abuso o adicción, impedir enfermedades físicas y trastornos mentales relacionados

con ese consumo, y disminuir el consumo de otras drogas ilegales (Becoña, 2007). Existe gran diversidad de programas preventivos en marcha. Burkhart (2005), al analizar la situación de la prevención en Europa, destacó positivamente el elevado número de programas desarrollado en España. Sin embargo, este auge no se acompaña de resultados preventivos claros y positivos. El inicio del consumo tiene lugar en edad escolar. Aunque existe consenso sobre la necesidad de prevenir en la escuela, los programas escolares de prevención no han ofrecido los resultados que era previsible esperar (Gómez, Barrueco, Aparicio, Maderuelo y Torrecilla, 2009). El hecho de que durante los últimos treinta años se haya realizado numerosos esfuerzos dirigidos a la prevención y que no se haya logrado superar el problema se debe a la eficacia limitada de los programas preventivos. A pesar de que existe una mejora de la eficacia, es necesario mejorar los resultados (Espada, Orgilés, Méndez, García-Fernández e Inglés, 2008).

Los programas de prevención son instrumentos dinámicos sometidos a una monitorización y evaluación que posibilita un proceso de mejora continua y su adaptación a los cambios sociales (Lloret, Espada, Cabrera y Burkhart, 2013). Por tanto, los resultados de las investigaciones sobre la eficacia y eficiencia de los programas de prevención son la principal fuente de información para la mejora de los mismos. Esto genera ciclos continuos de "implementación-evaluación-mejora-implementación" a los que se someten los programas y que les supone un continuo cambio (Brotherhood y Sumnall, 2011).

Para combatir la problemática del consumo de drogas se ha llevado a cabo intervenciones con diversos enfoques preventivos que, en su mayoría, han consistido en una presentación didáctica de la información para incrementar el conocimiento sobre drogas, con la expectativa de producir cambios en la conducta. Sin embargo, aunque estos programas incrementaron el nivel de conocimiento, no fueron efectivos en la modificación de conducta (Toumbourou y Stockwell, 2007).

Las características y los contenidos de los programas de prevención del consumo de sustancias adictivas en la adolescencia han experimentado una notable evolución en las últimas dos décadas. Se ha ido disminuyendo la importancia concedida a los efectos negativos del consumo a largo plazo, ya que se ha demostrado que el impacto de estos programas es limitado y su efectividad

decrece o desaparece con el tiempo, e incrementando la importancia de las habilidades sociales y la resolución de problemas para resistir a las presiones del grupo (Fernández et al., 2009). La evolución de dichos programas permite una mayor eficacia de los mismos, puesto que cuando la prevención es eficaz se convierte en el medio más efectivo y eficiente de reducir el impacto del consumo (Fernández-Hermida y Secades-Villa, 2010).

Adolescentes y consumo de tabaco

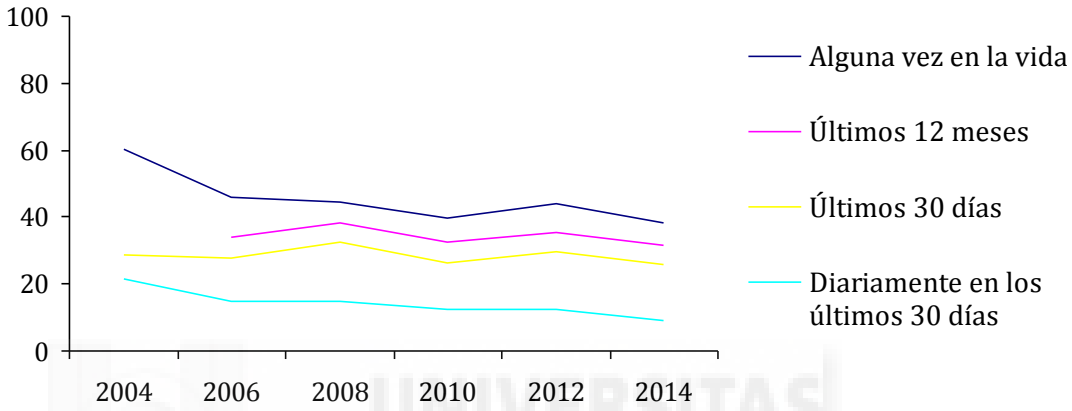
Según la Asociación Española contra el Cáncer (2014) el consumo de tabaco es responsable de aproximadamente el 30% de las muertes por cáncer, del 20% de las producidas por enfermedades cardiovasculares y del 80% de las enfermedades pulmonares obstructivas crónicas, haciéndose estos datos extensibles a la mayoría de los países.

La gran mayoría de consumidores adquirieron el hábito en la adolescencia (OMS, 2014). Los fumadores jóvenes adquieren el hábito y se convierten en adictos antes de alcanzar la edad adulta. Las intervenciones preventivas en la adolescencia suelen retrasar la edad de inicio, retrasando de esta forma la trayectoria de consumo precoz y abusivo (Oliva, Parra y Sánchez-Queija, 2008). Sin embargo, el retraso en la edad de inicio no es suficiente como elemento de prevención de un consumo posterior, siendo necesario elaborar intervenciones preventivas para esta etapa que reduzcan significativamente la frecuencia de consumo y la intención (Gil-Flores, 2008).

La estimación de la OMS (2011) es que actualmente existen en el mundo 150 millones de jóvenes consumidores, la mitad de los cuales podría morir de forma prematura como consecuencia del hábito tabáquico. Los datos de la última encuesta ESPAD, European School Survey Project on Alcohol and Other Drugs (Hibell et al., 2012) muestran que en Europa el 54% de los jóvenes europeos de 15 años ha probado el tabaco y más de la mitad de estos (51.85%) informa de haber fumado en los últimos 30 días. España continúa siendo uno de los países del mundo con mayor tabaquismo entre la juventud.

Se observa un incremento ininterrumpido del consumo entre escolares desde 1995 hasta 2004, un descenso hasta el año 2006 y una estabilización del consumo hasta 2008 (Observatorio Español sobre Drogas, 2013). A pesar de los esfuerzos, la prevalencia de consumo de tabaco entre adolescentes continúa siendo alta (EMCDDA, 2014).

Evolución del consumo de tabaco



FUENTE: ESTUDES 2012/2013. Observatorio Español sobre Drogas. DGPNSD. MSSSI.

Consumo de tabaco y factores de riesgo

Un aspecto fundamental en la prevención del consumo de drogas es el estudio, conocimiento y determinación de los factores que condicionan la aparición del mismo, para seleccionar aquellos que minimizan o favorecen el riesgo de consumir, con el objetivo de planfiicar y desarrollar programas eficaces basados en la modificación o potenciación de tales factores (Carballo et al., 2004). En los últimos años se han venido estudiando los factores psicosociales implicados en el consumo. Los factores de riesgo y protección deben ser entendidos en términos probabilísticos, de forma que cuantos más factores de riesgo estén presentes, mayor será la probabilidad de consumo y, cuanto más dure la exposición a éstos, más se incrementará esa probabilidad (Pons y Buelga, 2011). La identificación de dichos factores es imprescindible para poder dirigir acciones

enfocadas a la modificación de hábitos no sanos y potenciación de hábitos saludables. Conocer los factores de riesgo asociados al consumo de drogas nos permite identificar aquellas personas que están en mayor riesgo de consumir, conocer qué adolescentes son más vulnerables y desarrollar programas preventivos. El inicio del consumo de sustancias en esta fase evolutiva puede responder a la búsqueda de nuevas sensaciones (López y Rodríguez, 2012), de reconocimiento y aprobación de los demás o a una forma de participar con los iguales de la diversión y ocio juvenil (Finlay, Ram, Maggs y Caldwell, 2012). Asismismo, cabe tener en cuenta que el inicio y mantenimiento del consumo de drogas legales se ha identificado como un factor de riesgo para iniciarse en el consumo de drogas ilegales (Bell y Keane, 2014).

Teniendo en cuenta que el organismo de un adolescente se encuentra en pleno crecimiento, los efectos nocivos del consumo de sustancias resultan especialmente relevantes en lo referente al desarrollo cerebral, capacidad de memoria y aprendizaje, alteraciones de comportamiento, ansiedad, trastornos de sueño, cambios de humor y aumento del riesgo de suicidio (Becoña y Míguez, 2004; Ministerio de Sanidad, Servicios Sociales e Igualdad, 2012; Parada et al., 2011). Teniendo en cuenta la adolescencia como una etapa madurativa del individuo, resulta de gran relevancia el estudio del estado de ánimo y su relación con el consumo, como posible estrategia de los adolescentes para regular sus estados de malestar (Hrubá y Zaloudíková, 2010).

Programas de prevención y tratamiento del tabaquismo en la adolescencia

Además del impacto en la mortalidad y en la morbilidad, el tabaquismo tiene consecuencias sociales, económicas, educativas y ambientales que, por lo general, han sido menos estudiadas que las consecuencias estrictamente sanitarias. La epidemia tabáquica está actualmente muy extendida entre los adolescentes y no hay fundamento para prestar atención sólo al tabaquismo adulto, cuando la adicción está mucho más instaurada y comienzan a manifestarse consecuencias a largo plazo. Aunque los estudios muestran que es posible reducir significativamente la prevalencia del tabaquismo entre los adultos, tiene más

sentido desarrollar programas dirigidos específicamente a los adolescentes (Mendoza y López, 2007). Teniendo en cuenta la problemática del consumo de sustancias y el aumento de la prevalencia en los últimos años en población adolescente, se han desarrollado e implementado diferentes programas preventivos a nivel nacional. Sin embargo, son necesarias nuevas evidencias sobre los programas que funcionan, para mejorarlos y optimizar recursos.

Proyecto EX (Sussman, Lichtman y Dent, 2001) es un programa empíricamente validado para el cese del consumo de tabaco en adolescentes. Está considerado como un programa modelo por los Servicios de Salud Mental de los Estados Unidos y por la Oficina de Justicia Juvenil y Prevención de la Delincuencia. El programa fue elaborado a partir de un programa anterior denominado "Hacia el No Consumo de Tabaco" (Project Towards No Tobacco Use: TNT), financiado por el National Cancer Institute de EEUU desde 1987 a 1993. A las cinco sesiones de este programa se les añadió actividades agradables y de motivación con el fin de aumentar la tasa de abandonos, usando una metodología interactiva y un proceso de evaluación riguroso. Proyecto EX se deriva de un modelo teórico del tabaquismo en la adolescencia que resalta el papel de las habilidades personales, los factores motivacionales y el afrontamiento de la abstinencia, y está considerado como un programa eficaz para el cese del consumo de tabaco en adolescentes (Milton et al., 2004). La potenciación de la motivación, componente nuclear del programa, supone que los jóvenes: a) generen razones para dejar de fumar, mediante juegos de rol en los que se emulan programas televisivos con invitados, b) los efectos del tabaco en otras personas, c) observar que fumar incrementa (y no reduce) los niveles de estrés, d) conozcan los efectos negativos del tabaquismo pasivo, e) aprendan que cuanto más se mantiene el tiempo sin fumar resulta más sencillo mantenerse, y f) asimilen que es más fácil y se reduce el impacto en la salud dejar de fumar lo antes posible, en lugar de esperar a tener más edad.

La versión clínica de Proyecto EX está compuesta por 8 sesiones que tienen como objetivo final la deshabituación del tabaco. Persigue mejorar la motivación, las habilidades conductuales implicadas en el consumo y el nivel de información. Esta versión clínica se ha mostrado eficaz en los EE.UU., China y Rusia (Idrisov et al., 2013; Sussman, 2013; Sussman, Dent y Lichtman, 2001; Sussman et al., 2004).

Sin embargo, en el contexto escolar existen tanto fumadores como no fumadores. En varios centros escolares del sur de California se implementó una nueva versión de EX para la prevención y cese del consumo de tabaco, revelando mayores efectos en el abandono del consumo (Sussman, Miyano, Rohrbach, Dent y Sun, 2007; 2010). Interviniendo conjuntamente con escolares fumadores y no fumadores, los que no consumían actuaban como apoyo social para los que trataban de dejar de fumar. En el programa se proporcionaba información para motivar a los participantes con distintas razones para dejar el tabaco y/o para no empezar a consumirlo.

Objetivos

Teniendo en cuenta lo expuesto anteriormente, los objetivos generales de esta tesis son tres: (1) revisar y analizar la eficacia de los programas preventivos de drogas en escolares españoles, (2) profundizar en el conocimiento de los factores de riesgos asociados al consumo de tabaco en adolescentes españoles, y (3) evaluar la eficacia de Proyecto EX para la prevención y cese del consumo de tabaco en adolescentes españoles.

En primer lugar se analiza la eficacia de los programas escolares de prevención de drogas en el ámbito escolar llevados a cabo en España entre 2002 y 2013. A partir de los resultados es posible determinar la necesidad de evaluaciones más rigurosas de las intervenciones. En segundo lugar se analiza el papel de las variables emocionales como factores de riesgo para el inicio del consumo de tabaco en adolescentes y se examina su relación con la intensidad de dicho consumo. En tercer lugar se evalúa la eficacia de un programa para el tratamiento del consumo de tabaco en adolescentes fumadores, mediante una evaluación de efectos inmediatos y de seguimiento a los seis y doce meses. Asimismo, se implementa y evalúa la eficacia de este programa en su versión preventivo-interventiva a los doce meses de seguimiento.

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OBJETIVO 1

Analizar la eficacia de los programas españoles de prevención escolar del consumo de sustancias

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ESTUDIO 1

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Meta-analysis of the effectiveness of school substance abuse prevention programs in Spain

José P. Espada, María T. Gonzálvez, Mireia Orgilés,
Daniel Lloret y Alejandro Guillén-Riquelme
Universidad Miguel Hernández (España)

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Meta-analysis of the effectiveness of school substance abuse prevention programs in Spain

José P. Espada, María T. Gonzálvez, Mireia Orgilés, Daniel Lloret and Alejandro Guillén-Riquelme
Universidad Miguel Hernández

Abstract

Background: There has been an increase in adolescent substance use that has led to the development and implementation of prevention programs. New evidence is needed in order to improve them and optimize the resources. The aim of this paper is to use a meta-analysis to analyze the effectiveness of school drug prevention programs in Spain. **Method:** Twenty-one studies that evaluated drug abuse prevention programs in schools, were published between 2002 and 2013, and that met the selection criteria were identified. **Results:** Preventive program effectiveness was low (d= 0.16), although it was higher at the follow-up (d= 0.30). The programs were most effective in changing attitudes (d= 0.44) towards drugs. The models of health education (d= 0.48) and social learning (d= 0.20) were also very effective, especially in combination with oral, written, and audiovisual support material (d= 0.21) and the implementation of joint programs by health education professionals and faculty members (d= 0.25). **Conclusions:** Is possible to determine the need for more rigorous evaluations of interventions to establish useful programs.

Keywords: meta-analysis, prevention, drugs, school environment, teens.

Resumen

Meta-análisis de la eficacia de los programas de prevención escolares del abuso de sustancias en España. **Antecedentes:** en los últimos años se ha producido un aumento del consumo de sustancias en población adolescente. Es necesario contar con nuevas evidencias sobre programas que funcionan y mejorar aquellos que se están realizando con el fin de optimizar los recursos. El objetivo de este trabajo es analizar la eficacia de los programas escolares de prevención de drogas en España mediante un meta-análisis. **Método:** se identificaron 21 estudios publicados entre 2002 y 2013 que cumplieron los criterios de selección y que evaluaban programas de prevención del abuso de drogas en el ámbito escolar en España. **Resultados:** la eficacia preventiva de los programas fue baja (d= 0.16), aunque era mayor en las medidas de seguimiento (d= 0.30). Los programas resultaron más eficaces en la modificación de las actitudes hacia las drogas (d= 0.44). Los modelos de educación para la salud (d= 0.48) y aprendizaje social (d= 0.20) resultaron más eficaces, junto con la combinación de soporte oral, escrito y audiovisual del material (d= 0.21) y la implementación de los programas por profesionales y profesorado conjuntamente (d= 0.25). **Conclusiones:** A partir de los resultados es posible determinar la necesidad de evaluaciones más rigorosas de las intervenciones.

Palabras clave: meta-análisis, prevención, drogas, ámbito escolar, adolescentes.

Adolescent substance use remains a serious problem in Spain. Better prevention programs are of paramount importance in addressing this problem. However, it is first necessary to evaluate the effects of current Spanish drug prevention programs and to examine what would make them more effective.

Meta-analyses are a fast and safe way of consolidating the latest scientific evidence on any subject (Sánchez-Meca & Botella, 2010). The methodology of meta-analysis is noted for its ability to direct the replication of studies and to allow for the analysis of the sources of heterogeneity in study results (Marín-Martínez, Sánchez-Meca, & López-López, 2009).

The first meta-analysis regarding substance abuse (Tobler, 1986) found that the programs produced a moderate effect on the levels of drug knowledge, but had a negligible effect in changing attitudes. Bangert-Drowns (1988) concluded that voluntary participation produced greater behavioral changes and the programs that used fellow group leaders as monitors did better. The meta-analysis conducted by Rundall and Bruvold (1988) agreed with Tobler that programs did not change attitudes but they increased the level of knowledge, and retention of this knowledge had a positive long-term effect on consumption.

Rooney and Murray (1996) reviewed smoking prevention programs, discovering that the most effective of these had the following characteristics: annual follow-ups, observation and feedback, random assignment of prevention groups, follow-up booster sessions in later years, peers of the same ages as the monitors, and they lasted for ten sessions or less. Shortly after this meta-analysis, Tobler, Lessard, Marshall, and Ochshorn (1999) analyzed marijuana prevention programs. This time, they concluded that interactive programs implemented by psychologists and educators produced major changes if they were supported by peers or teachers.

The reviews carried out in recent years to determine the effectiveness of substance prevention programs have established

Received: May 9, 2014 • Accepted: December 10, 2014
Corresponding author: María T. Gonzálvez
Dpto. Psicología de la Salud
Universidad Miguel Hernández
03202 Elche (Spain)
e-mail: mgonzalvez@umh.es

that social influence (Cuijpers, 2002) and social skills (Faggiano et al., 2005, 2008), combined with the use of group leaders to strengthen the impact of programs (Thomas, 2004), all improve the efficacy of treatment programs. Additionally, Faggiano et al. (2005) highlighted the importance of evaluating the individual components making up the interventions (e.g., peers, parents, booster sessions). They also stated that affectivity-based programs improved decision making and knowledge, while knowledge-based programs improved mediating variables, but that neither was as effective as skills-based programs (Faggiano et al., 2008).

In Spain, a meta-analysis of prevention program studies published between 1985 and 2002 was performed (Espada et al., 2002), concluding that the preventive efficacy of the programs tended to increase over time. As for the substance involved, the more effective programs always focused on alcohol abuse prevention. Regarding the theoretical model of choice, the programs based on the theories of reasoned action and social learning performed better than others did.

Researchers at the international level have recently conducted several meta-analyses of school substance abuse prevention programs. However, in Spain, for more than a decade, there has been a lack of quantitative analyses on determining the effectiveness of preventive interventions. Therefore, it is necessary to find new evidence about the major characteristics of the most effective current programs in order to optimize resources. Thus, the objective of this study is to conduct a meta-analysis to integrate the results of the research carried out in this field in recent years in Spain, with the purpose of evaluating the effectiveness of programs aimed at preventing drug use in Spanish adolescents, and analyzing the variables that modulate their preventive efficacy.

Methods

Literature search and inclusion criteria

The literature search was conducted using major databases (PsychInfo, Medline, Scopus, Tripdatabase, Social Science Citation Index, Cochrane, and the databases of CSIC: ICYT, ISOC, and IME), gray literature (Google Scholar and Teseo), and a direct review of specialized journals, books, and monographs. We included theses, books, and monographs to minimize the publication bias. In all of these documents, we used the inclusion criteria, and guarantee the use of a control group or repeated measures and methodological aspects to control for the methodological quality of these documents.

The search terms were: *teen, young, youth, intervention, study, program, school, meta-analyses, Spain, abuse, drug use, illegal drugs, psychoactive substances, snuff, alcohol, cocaine, ecstasy, marijuana,* and *cannabis*. These terms were searched in full documents. Only Spanish or English studies were included. The criteria for study inclusion were:

a) The program had been implemented with Spanish adolescents.
b) The study had been published between 2002, the year in which the last meta-analysis (Espada et al., 2002) with the same objectives as this study took place, and 2013, which was the year this review was conducted.
c) The study reported on the program outcome evaluations, which were aimed at primarily preventing drug abuse in adolescents between ages 10 and 19 years within a school context.
d) The study submitted sufficient data to calculate effect sizes.
e) The study had an experimental, or quasi-experimental, design with pretest-posttest and/or follow-up measures.

The literature search identified 15,543 studies, of which 21 were finally included in the meta-analysis (Figure 1). The 18 articles were published. Fifteen expert authors in the field of study were contacted by e-mail in order to obtain information concerning unpublished work that had not yet been included in our study. Only three authors responded without providing further studies.

Coding the studies

A manual detailing of the criteria for coding the study characteristics in order to increase the accuracy of the results was developed. To avoid bias due to coding order, the studies were presented randomly to the coders.

Two reviewers read 1,078 abstracts to assess the relevance of each summarized study and to make an inclusion decision. The full text of the 103 works remaining after the abstract review was obtained. Eighty-two papers were excluded for methodological reasons (i.e., lack of preventive program control or a comparison group, insufficient data for statistical analysis, and/or duplicate data that presented in other studies).

Data from the 21 papers finally included in the meta-analysis were extracted independently by the two reviewers. The degree of agreement was found with Cohen's kappa coefficient and intraclass correlation coefficient. The average value was .714 (range: .518 to 1). Disagreements were resolved by a third reviewer.

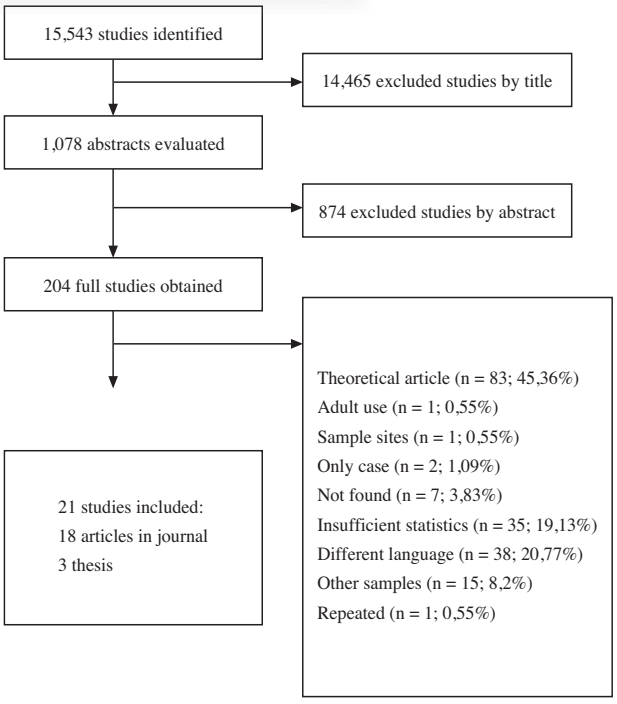

Figure 1. *Identification of included studies*

Characteristics of the studies

The year 2008 saw the highest percentage (20%) of studies compared to every other year in the period of interest. In the past two years, there has been a sharp decline in the research into this field, with a representation of 5% of the total publications in both 2012 and 2013. Three of the studies were doctoral theses, while the others were scientific articles. All the studies included had control group, to ensure the methodological quality of them.

Tables 1 and 2 show the main variables of the included studies. Eighteen of the studies reported the gender of the participants, with a high percentage of women (*M*= 53.92%; *SD*= 18.09%). Only four studies requested their participants to complete homework, and parental participation was assessed in five studies.

Table 1
Qualitative variables (n= 21)

Variable	Category	Frequency (%)
Main substance	1. Tobacco	10 (47.62%)
	2. Alcohol	2 (9.52%)
	3. Alcohol + Synthetic drugs	2 (9.52%)
	4. Cannabis	1 (4.76%)
	5. Alcohol + Tobacco + Synthetic drugs	1 (4.76%)
	6. Drugs, in general	5 (23,81%)
Theory	1. Social learning	2 (10%)
	2. Reasoned action	1 (5%)
	3. Social influence model	1 (5%)
	4. Health education	6 (30%)
	5. Others	10 (50%)
Methodology	1. Active	17 (80.95%)
	2. Passive	2 (9.52%)
	3. Unspecified	2 (9.52%)
Assignment	1. Incidental	9 (42.86%)
	2. Random	4 (19.05%)
	3. Pseudorandom	6 (28.57%)
	4. Unspecified	2 (9.52%)
Components	1. Information	19 (90%)
	2. Modeling	11 (52%)
	3. Social skills	13 (61%)
	4. Solving problems	6 (29%)
	5. Self-control	3 (14%)
	6. Emotional education	4 (19%)
	7. Operational techniques	4 (19%)
	8. Making personal decisions	11 (52%)
	9. Public commitment	7 (33%)
	10. Normative expectations + advertising	3 (14%)
	11. Leisure	2 (1%)
	12. Leisure + advertising	1 (0.5%)
Information	1. Oral	2 (9.52%)
	2. Oral + written	3 (14.29%)
	3. Oral + written + audiovisual	8 (38.1%)
	4. Unspecified	8 (38.1%)
Administrator	1. Professional	16 (76.19%)
	2. Mixed	2 (9.54%)
	3. Unspecified	3 (14.28%)
Administrator training	1. Psychologist	9 (21.95%)
	2. Educator	6 (14.63%)
	3. Professor	18 (43.90%)
	4. University student	6 (14.63%)
	5. Other	2 (4.88%)

Of all the programs examined, only four included booster sessions. Of the 21 studies, twelve included only one program, two included two programs, three included three programs, and four included four programs. The total sample size in the posttest was n= 10,956, and in the follow-up was n= 9,149. More than one-third (38.1%) of the studies reported that they had conducted a preliminary training of administrators. In most cases, this training was conducted via a special training course before administration. In one study, the training was provided through a self-manual. One of the studies carried out follow-ups with the administrators via fortnightly meetings. There was great variability in the training times, with the longest duration being 48 hours. More than one-third (35%) of the studies used manualized programs.

As for the measurement instruments used in the evaluations, 70% of the studies used at least one objective or standardized assessment method (stable measurements), while 10% employed standardized self-reports, and 20% used unstandardized self-reports. In 55% of the cases, the psychometric data of the utilized instruments were provided. Implementation fidelity was controlled only in two of the studies, analyzed by self-reports.

Of the 21 studies analyzed, 42.9% held a cluster effect control by center and application group, controlling for contamination bias. Only 16.2% applied an experimental design.

As for the drop rate, 45% of the studies controlled for attrition. The average percentage of students who continued at posttest was 75.45% (*SD*= 31.09%).

An assessment of the average quality of the reviewed studies was made according to nine criteria [0-9]: randomization, type of design, sample size, attrition, follow-up actions, evaluator-blind procedure, average pre-post consistency, use of objective and standardized tools, and implementation fidelity. The average methodological quality of the studies was moderate (*M*= 4.88; *SD*= 1.43).

Effect size index

The effect size was calculated using the standardized difference between the pre-post mean for the intervention group. We calculated the effect size for each dependent variable included in the analysis (Knowledge of drugs, attitudes towards drugs, intention and drug consumption). This effect size was used for the efficacy in each dependent variable and for total effect. We calculated the effect size for posttest and follow up independently.

Statistical analysis

To calculate the general effect size, we used a fixed effects model, because the number of studies was lower. Moderator

Table 2
Quantitative variables

Variable	n	Minimum	Maximum	M	SD
Number of sessions	14	4	20	9.71	4.84
Length of intervention (in weeks)	5	4	20	9.20	6.83
Number of intervention hours	5	2	20	10.40	6.54
Follow-up (in months)	9	6	24	12.55	5.02
Study quality (0 to 9)	18	2.5	8	4.83	1.35

analysis was done with analysis of variance and weighted continuous moderators with weighted meta-regression models. The homogeneity in the results was examined with the *Q* statistic. To analyze the publication bias, Egger's regression test was used. We used *metafor* package for *R* program (Viechtbauer, 2010).

Table 3
Average effectiveness of preventive programs

Program effectiveness	Posttest					
			95% CI			
	k[a]	d	Lower limit	Higher limit	Q[b]	p
Global	36	0.16	0.10	0.22	77.63	<.01
Efficacy variable						
Knowledge of drugs	18	0.34	0.23	0.45	70.66	<.01
Attitudes towards drugs	15	0.44	0.33	0.54	65.36	<.01
Intention	14	0.23	0.14	0.32	20.55	<.01
Drug consumption	20	0.18	0.11	0.26	25.42	<.01
Substance						
Alcohol	20	0.38	0.27	0.49	72.38	<.01
Tobacco	12	0.20	0.1	0.30	16.87	<.01
Cannabis	11	0.19	0.05	0.32	15.99	<.01
Other drugs	23	0.19	0.1	0.28	46.74	<.01

Note: [a] Number of studies; [b] Overall intragroup homogeneity test.

Results

Short-term efficacy of the programs

The effect sizes of the programs were calculated from the mean scores and standard deviations of the intervention. A summary of these is shown in Table 3, where it can be seen that the global average effect size is 0.16 (*SE*= 0.03). When analyzing observed variability, heterogeneity was shown to be very high (*Q*= 132.4; *p*<.01). The Egger's regression test was *Z*= 2.28 (*p*= .02) for posttest and *Z*= 0.97 (*p*= .33) for follow up.

Influence of moderator variables on short-term efficacy

Because homogeneity was observed in the effect sizes, we proceeded to analyze the source of variability. A summary of these is shown in Table 4. First, we included the underlying theory for each of the preventive programs. The model in which interventions are most effective is the *health education model*. We observed no effect sizes greater than 0.2 for the rest of the included theoretical models.

With respect to the support materials, the effect size was small for all combinations, but it was somewhat higher when the oral, written, and audiovisual materials were used together. Conversely, programs that combined the oral and audiovisual material were not effective, but the oral material alone obtained somewhat

Table 4
Moderator analysis for Short-Term Efficacy of the Programs

Variable	Category	k[a]	d/b	95% CI		Qb[b]	Qe	p
				Lower	Higger			
Theory		37				76.87	104.95	
	Social learning		0.1031	0.0102	0.1959			.0296
	Reasoned action		0.0999	-0.2253	0.4251			.5469
	Social influence model		0.1181	-0.4879	0.7241			.7025
	Health education		0.478	0.3547	0.6041			<.0001
	Others		0.1895	0.0901	0.2895			.0002
Materials		32				21.55	13.33	
	Oral		0.15	-0.5567	0.8567			.6774
	Oral + written		0.0171	-0.1611	0.1953			.8508
	Oral + written+audiovisual		0.2126	0.1214	0.3039			<.0001
	Oral + audiovisual		0.04	-0.0714	0.1514			.4816
Information		23				50.72	64.75	
	Oral		0.2596	0.1159	0.4033			.0004
	Audiovisual		0.04	-0.0714	0.1514			.4816
	Oral + written		0.0251	-0.1458	0.1961			.7732
	Oral + written + audiovisual		0.3481	0.2369	0.4594			<.0001
Program administrator		29				24.71	49.29	
	Professional		0.1348	0.0696	0.1999			<.0001
	Professional + teachers		0.2466	0.0785	0.4146			.004
Report		34				38.44	62.65	
	Journal		0.1185	0.0558	0.1811			.0002
	Doctoral dissertation		0.3465	0.2099	0.4832			<.0001
Durattion*		14	0.0031	-0.0134	0.0196	0.1336	25.54	.7147
Hours*		16	-0.0519	-0.0692	-0.0347	34.96	51.27	<.0001
Number of sessions*		26	-0.014	-0.0302	0.0023	2.8293	91.92	.0926

Note: [a] Number of studies; [b] Overall intragroup homogeneity test; * Continuous variable

better results. Regarding the type of program administrator, both in the programs run by professionals alone and in programs implemented jointly by professionals and teachers, the effect sizes were small.

Program duration, number of program hours, and number of sessions had no influence on the efficacy of the program. In contrast, programs reported in articles published in journals had smaller effects on overall program efficacy than did programs presented in dissertations. In Table 5, we summarize the moderator effects of each quality item and the total quality.

Medium and long-term program efficacy

Table 6 reports the mean effect sizes for programs that included a follow-up year (± 2 months) and for those doing track after two years of program implementation (± 2 months). At the 12-month follow-up, 27 programs were reported as effective. In this case, the medium effect size was small (d= 0.3; p<.01). Again, variability was very high (Q= 57.4; p<.01), so the sources of variability were examined. Oral and written program information together showed statistically significant results (d= 0.69; p<.01). The type of therapist implementing the program explained part of the variability, as the programs implemented by professionals alone (d= 0.25; p<.01) and those implemented by professionals and teachers together (d= 0.48; p<.01) showed remarkable differences in effectiveness. Again, duration (bj= 0.06; p= .02), number of hours (bj= 0.01; p<.01), and number of sessions (bj= -0.06; p<.01) had no impact on the effectiveness of these programs. In the 24-month follow-up, only four articles that the programs were still effective, which is a paltry proportion (d= 0.03; p= 0.65; Q= 11.4; p= 0.02).

Discussion

The aim of this study was to evaluate the efficacy of school drug prevention programs in Spain and to analyze how various modulating variables influence the efficacies of such programs. The programs implemented in the school context showed small effect sizes (d= 0.25), with a tendency to increase in follow-up assessments (d= 0.3), although there is a high variability among the studies. For global effect, the heterogeneity was very high. This result is normal because we included experimental studies and quasi experimental studies, but it is important to interpret this result with caution. In this sense, the results of scientific examinations of school-based prevention in our country have not changed substantially over the past decade, if we compare the present results to those of previous meta-analyses (Espada et al., 2002).

Similar to previous observations, the programs evaluated herein were more effective in preventing alcohol use and in changing the attitudes towards drugs in the short term. They were less effective at preventing consumption. According to Griffin, Botvin, Scheier, and Nichols (2002), variations in consumption usually are detected at follow-up.

Espada et al. (2002) found that programs based on the theories of reasoned action and social learning were the most effective, while the present review shows that the social learning and health education theories yielded the best results.

Currently, many prevention programs are implemented in the classroom by outside specialists. Several investigations have been conducted to discover the most effective preventive agent, with mixed results. In previous research, it was found that programs implemented by professionals outside the school achieved better

Table 5
Moderator analysis for quality items

Variable	Category	k[a]	d	95% CI		p	Qb[b]	Qe
				Lower	Higger			
Randomization		36					50.6769	131.0147
	Not randomization; no control		0.2293	0.149	0.3096	<.0001		
	Not randomization; some control		0.1436	0.0217	0.2655	.0209		
	Randomization		0.1948	0.0929	0.2968	.0002		
Design		38					49.5046	132.3632
	Quasi-experimental		0.2029	0.1361	0.2697	<.0001		
	Experimental		0.1948	0.0929	0.2968	.0002		
Mortality		13					16.7498	21.4894
	> = 20%		0.2121	-0.1641	0.5883	.2691		
	< 20%		0.1696	0.0794	0.2598	.0002		
	0%		0.1016	-0.041	0.2441	.1625		
Follow up		23					16.9061	37.9803
	No follow up		0.2861	0.0477	0.5245	.0186		
	Follow up (6-11 months)		0.1535	0.0317	0.2753	.0135		
	Follow up (before 12 months)		0.1006	0.0147	0.1865	.0217		
Instruments		36					68.4161	112.6315
	Non standarized instruments		0.4129	0.2411	0.5847	<.0001		
	1 or more standarized		0.02	-0.176	0.216	.8415		
	1 or more objetive		0.2585	0.1839	0.333	<.0001		
Global quality*		36	-0.0512	-0.0901	-0.0124	.0096	6.7007	117.0394

Note: In "sample size", "average pre-post consistency" and "blind" all studies had the same values. [a] Number of studies; [b] Overall intragroup homogeneity test. * Continuous variable

results (Espada et al., 2002; Espada, Rosa, & Méndez, 2003). Meanwhile Moral, Ovejero, Sirvent, and Rodríguez (2005) found significant results in reducing drug use when the program was applied by outside experts. Conversely, Gázquez (2010) concluded that teachers achieve results that are more favorable to reduce drug use. The present study concludes that the programs implemented by professionals and teachers together are those with the greatest efficacy (d= 0.48).

Program intensity is another variable that needs to be considered when obtaining evidence about preventive program efficacy. In this paper, duration, number of hours, and number of sessions were not influential in obtaining the preventive effect,

Table 6
Empirical studies included in the meta-analysis

Author	Year	Substance	Component studies	Average age	Quality	d posttest	d follow-up at 12 months	d follow-up at 24 months
Adame	2005	Tobacco	Information + SKT + PS	–	4	0.55	–	–
Ariza et al.	2008	Tobacco	Information + modeling + SKT	–	5	–	0.58	0.70
Ariza et al.	2013	Cannabis	Information + modeling + SKT	14.50	5	0.12	–	–
de Vries et al.	2006	Tobacco	Information + modeling + SKT	–	5	–	–	0
de Vries et al.	2003	Tobacco	Information + modeling + SKT	–	4	-0.02	–	–
Espada, Griffin, Pereira, Orgilés, & García-Fernández	2012	Generic	Information + modeling + SKT + PS	14.30	8	0.04	0.70	–
			Information + SKT	14.30	8	0.09	0.59	–
			Information + PS	14.30	8	-0.11	0.80	–
Espada, Hernández, Orgilés, & Méndez	2010	Alcohol, tobacco and other drugs	Information + modeling + SKT + PS	14.17	5	0.56	-0.02	–
			Information + SKT	14.17	5	0	0.24	–
			Information + PS	14.17	5	-0.33	-0.16	–
Espada, Orgilés, Méndez, García-Fernández, & Inglés	2008	Alcohol, cannabis and other drugs	Information + modeling + SKT + PS	14.17	5	0.82	–	–
			Information + SKT	14.17	5	-0.19	–	–
			Information + PS	14.17	5	-0.68	–	–
Fernández, Carballo, & García	2003	Generic	Information	–	4.5	0.30	–	–
García, López, Fernández, & Catala	2003	Alcohol, tobacco, generic and other drugs	Information + modeling + SKT	15.83	4.5	0.12	–	–
García et al.	2005	Tobacco	Information + modeling + SKT	–	6.5	0.04	–	–
García-Vázquez et al.	2008	Tobacco	Information	17.40	2.5	0.02	–	–
Gázquez, García, & Espada	2011	Tobacco	Information + modeling + SKT	12.40	6.5	0.13	0.02	–
			Information + modeling + SKT + PS	12.40	6.5	0.17	0.11	–
Gómez, Barrueco, Aparicio, Maderuelo, & Torrecilla	2008	Tobacco	Information	14.24	4.5	0.33	–	–
Gómez, Luengo, & Romero	2002	Tobacco, alcohol, cannabis and other drugs	Information + SKT	14.32	4	–	-0.06	-0.12
Gómez, Luengo, & Romero	2003	Tobacco, alcohol, cannabis and generic drugs	Information + SKT + PS+ emotional training	14.42	5	0.07	0.17	-0.01
			Information + SKT + PS+ emotional training	14.42	5	0.01	0.14	0.08
Hernández	2010	Alcohol, cannabis and generic drugs	Information + modeling + SKT + PS	14.90	6.5	0.15	0.48	–
			Information + modeling + SKT + PS	14.90	6.5	0.23	0.39	–
			Information + modeling + SKT + PS	14.90	6.5	0.29	0.59	–
			Information + modeling + SKT + PS	14.90	6.5	0.35	0.45	–
Marrero	2011	Alcohol and tobacco	Information	15.80	5	0.47	–	–
Moral, Ovejero, Sirvent, & Rodríguez	2005	Generic	Information	–	3.5	0.21	0.43	–
			Information		3.5	1.29	0.36	–
			Information		3.5	0.76	0.22	–
			Information		3.5	0.60	1.20	–
Moral, Rodríguez, Ovejero, & Sirvent	2009	Alcohol	Information	14.69	3.5	1.18	0.55	–
			Information	14.69	3.5	1.74	0.35	–
			Information	14.69	3.5	1.10	0.20	–
			Information	14.69	3.5	1.14	0.36	–
Moral-Jiménez, Ovejero-Bernal, Castro, Rodríguez-Díaz, & Sirvent-Ruiz	2011	Generic	Information	–	3.5	0.52	-0.31	–
			Information		3.5	-0.32	-0.24	–
			Information		3.5	0.24	-0.03	–
			Information		3.5	0.35	-0.62	–

Note: *PS* = Problem solving; *SKT* = Social skills training

and these results are contrary to what was observed by Espada et al. (2002), in which programs with a higher number of sessions tended to be more effective. According to Cuijpers (2002), there is no conclusive evidence that more intensive programs are more effective than are those that are less intense. This finding implies that, in order to optimize resources, it would be of interest for professionals to carry out programs distributed in fewer sessions.

This study provides data so far unknown about the effectiveness of prevention programs in Spain over the past twelve years. However, there are some limitations to consider. First, the methodological shortcomings (e.g., the lack of objective assessments, the lack of a control group, the absence of sufficient data to carry out the appropriate analyses) likely had an impact on our current results. Second, the studies in the meta-analysis are not without their own limitations; therefore, it is necessary to be cautious in concluding certain evidential aspects. Many of the studies showed only what was effective, and others have severe methodological problems (e.g., sample attrition, lack of randomness in the selection of subjects, and lack of long-term assessments). Third, the existence of few evaluating studies, and the heterogeneity and the variability of the results obtained is evident.

However, the present meta-analysis helps to integrate the findings of the studies that have been conducted over the past decade with a common metric, which allows us to discover the relationships between the study characteristics and results. In addition, from our results, it is possible to determine the need for more rigorous evaluations of interventions, such as by controlling for the fidelity and integrity of the applications when implementing well-established programs and monitoring the effects of the variables that may influence the effectiveness of the results. In addition, such control is essential for future research in order to evaluate the results of programs and to recognize their usefulness and for possible replications.

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OBJETIVO 2

Examinar los factores de riesgo asociados al consumo de tabaco

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ESTUDIO 2

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Estado de ánimo y consumo de tabaco en una muestra de adolescentes españoles

María T. Gonzálvez, José Pedro Espada y Mireia Orgilés

Universidad Miguel Hernández (España)

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ORIGINAL

Estado de ánimo y consumo de tabaco en una muestra de adolescentes españoles

María T. Gonzálvez*, José P. Espada y Mireia Orgilés

Universidad Miguel Hernández, Elche, Alicante, España

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PALABRAS CLAVE
Estado de ánimo;
Tabaco;
Adolescentes

Resumen
El tabaco es la segunda droga más consumida entre los escolares españoles. Existen evidencias sobre la relación entre estado de ánimo y tabaquismo, aunque los resultados no son concluyentes y se desconoce el grado en que esta variable predice el consumo de adolescentes españoles. El objetivo de este estudio es comparar el estado de ánimo entre adolescentes fumadores y no fumadores, y comprobar si los fumadores presentan mayor intensidad de consumo con peor estado anímico. Se reclutó una muestra de 1507 adolescentes españoles (edad, *M* = 15.28; *DT* = 1.20). Se evaluaron variables sociodemográficas, estado de ánimo mediante la versión breve del *20-item Center for Epidemiologic Studies Depression Scale* (CED-D), y la conducta de consumo de tabaco alguna vez y durante el último mes y frecuencia mediante un autoinforme. Los adolescentes fumadores presentan peor estado de ánimo que los no fumadores. Es más probable ser fumador en presencia de bajo estado de ánimo ($B = 1.17$; $p < .001$). Los fumadores (n = 487) fueron clasificados en función del estado de ánimo. Los adolescentes con bajo estado de ánimo hacen mayor consumo diario de cigarrillos. Los fumadores con mejor estado de ánimo tenían una pauta de consumo de menor intensidad. Se aportan nuevas evidencias sobre el papel del estado de ánimo depresivo de los adolescentes como factor de riesgo de iniciar consumo de tabaco, y se comprueba su relación con mayor intensidad de consumo. Las intervenciones preventivas con adolescentes deben atender a los factores emocionales relacionados con el consumo.
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*Autor para correspondencia.
Correo electrónico: mgonzalvez@umh.es (M.T. Gonzálvez).

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KEYWORDS
Mood;
Tobacco;
Adolescents

Mood and smoking habits in Spanish adolescents

Abstract
Tobacco is the second most used drug among Spanish adolescents. Although there is evidence of the relationship between mood and smoking, the results are inconclusive, with the variable that predicts the consumption in Spanish adolescents still being unknown.
The aim of this study was to compare mood among adolescent smokers and non-smokers, and to determine whether smokers smoke more when in a worse mood. A sample of 1507 Spanish adolescents was selected (Mean age = 15.28; *SD* = 1.20). The sociodemographic variables were recorded. Mood was evaluated using the Brief version of the 20-item Center for Epidemiologic Studies Depression Scale (CED-D), and the behavior of tobacco use (sometime, during the last month and frequency) through self-report. Adolescent smokers have a worse mood than non-smokers. They are more likely to be a smoker when their mood is low (*B* = 1.17; *P* < .001). Smokers (*n* = 487) were classified depending on their mood. Adolescents with a low mood showed a higher daily consumption of cigarettes. Smokers with a better mood had a lower consumption pattern.
Conclusion: New evidence is presented on the role of depressed mood as a risk factor for the initiation of smoking among adolescents, demonstrating its relation to greater tobacco use. Preventive interventions with adolescents must address the emotional factors related to consumption.
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El consumo de tabaco por los adolescentes continúa siendo un importante problema de salud pública. Según la Organización Mundial de la Salud, el 22% de los adolescentes mayores de 15 años son fumadores de tabaco habituales (OMS, 2014). En España, según el último informe del Observatorio Español sobre Drogas (OED, 2013), el tabaco es la segunda sustancia adictiva más consumida, con un 35.3% de adolescentes que han fumado alguna vez. La edad de inicio se sitúa en torno a los 13 años, y se convierte en consumo estable a los 15 años (Ariza et al., 2014).

La mayoría de los adolescentes se inician en el consumo como consecuencia de una combinación de factores de riesgo, entre los que se encuentra el malestar emocional (Staten et al., 2007). La prevalencia del estado de ánimo negativo en adolescentes españoles es del 14.9% de los chicos y el 16.9% de las chicas, y alcanza el 20.7% de los estudiantes de Bachillerato (Vázquez et al., 2013). Aunque existen evidencias sobre la bidireccionalidad entre el consumo de tabaco y el estado de ánimo (Sánchez-Sosa, Villarreal- González, Ávila, Vera & Musitu, 2014), no hay acuerdo sobre su relación causal (O'Chaiton, Cohen, Loughlin & Rehm, 2009). Por un lado, algunos autores sostienen que los adolescentes fuman para regular sus estados de malestar (Choudhary, Coben & Bossarte, 2008; Hrubá & Zaloudíková, 2010), y recurren al consumo como una modalidad de escape y como mecanismo de afrontamiento/huida (de la Villa, Rodríguez & Ovejero, 2010). En el estudio de Espada, Sussman, Huedo-Medina y Alfonso (2011), se observó un mayor consumo de tabaco y también de alcohol y cannabis entre los adolescentes depresivos que entre sus pares sin trastornos psicológicos. Este vínculo podría explicarse por las propiedades antidepresivas de la nicotina (Balfour & Ridley, 2000). Algunas investigaciones refuerzan esta hipótesis de la automedicación (Audrain-McGovern, Rodríguez & Kassel, 2009) como modelo explicativo de la asociación entre depresión y hábito tabáquico. Mediante los receptores de acetilcolina nicotínicos (nAChRs), la nicotina tiene un efecto neurotransmisor como la serotonina, que modula la respuesta a la depresión (Mineur & Picciotto, 2010). Tanto la nicotina como los agentes nicotínicos reducen los síntomas depresivos, lo que explica el fenómeno de la automedicación y genera comorbilidad (Weinberger, McKee, Picciotto & Mazure, 2011).

Por otro lado, en oposición a la hipótesis de la automedicación, algunos estudios afirman que el consumo de tabaco se asocia a estados depresivos y estados de ánimo negativos (Fernández del Río & Becoña, 2009; Groth & Morrison-Beedy, 2011), de forma que el consumo implica mayor riesgo de sufrir síntomas depresivos (González-González et al., 2012). Desde esta perspectiva, el consumo de tabaco se concibe como un factor de riesgo de síntomas depresivos (Colvin & Mermelstein, 2010). Desde este enfoque se enfatiza el efecto del consumo de tabaco en las concentraciones serotoninérgicas (Rubinstein et al., 2011).

A pesar de las evidencias existentes sobre la relación entre los estados anímicos negativos y el consumo de tabaco, los resultados resultan contradictorios. Ahonen, Nebot y Giménez (2007) hallan en adolescentes españoles una asociación significativa entre consumo diario de tabaco y otros estados de ánimo negativos. Sin embargo, un estudio reciente llevado a cabo por Martínez-Hernáez et al. (2012), con una muestra similar, concluye que la comunicación con el padre anula dicho efecto.

Por lo tanto, hay evidencia de que la depresión es un factor de riesgo de consumo de sustancias adictivas en la adolescencia. Sin embargo, a la hora de analizar las variables que facilitan el consumo de drogas, los estudios previos se han centrado en factores como la edad o el sexo (ESTU-

DES, 2013; EDADES, 2011) y han descuidado la influencia de otro tipo de factores en ese riesgo. Asimismo, pese a que hay evidencia de la influencia del estado de ánimo en el consumo de tabaco en relación con otras variables, se desconoce la influencia directa de esta variable en el consumo de la población adolescente española.

El presente estudio se centra en comparar el estado de ánimo entre adolescentes fumadores y no fumadores, y analizar si hay más intensidad de consumo de tabaco en función del estado anímico. Las hipótesis de partida son: *a)* los adolescentes fumadores tendrán peor estado de ánimo que los no fumadores; *b)* habrá mayor probabilidad de pertenecer al grupo de fumadores en caso de bajo estado de ánimo, y *c)* en los fumadores se hallará una relación positiva entre el bajo estado de ánimo y la intensidad de consumo.

Método

Participantes

Se reclutó a 1507 adolescentes con edades entre 14 y 19 años (*M* = 15.28; *DT* = 1.20) de seis centros de educación secundaria de la provincia de Alicante, con el fin de generalizar en mayor medida los resultados obtenidos. Del total, 717 (47.54%) eran chicas. El 90.8% de los participantes eran de nacionalidad española. El 78.7% convivía con ambos padres; el 12.1%, solo con la madre y el 2.2%, solo con el padre. Del total de la muestra, 490 (32.4%) han fumado alguna vez y 239 (16.8%) lo han hecho durante el último mes. En la tabla 1 se puede consultar los datos de los participantes.

Instrumentos

Las variables sociodemográficas se evaluaron con ítems sobre sexo, edad y nacionalidad, además de datos académicos (instituto y curso).

El estado de ánimo se evaluó mediante la versión breve de la escala *20-item Center for Epidemiologic Studies Depression Scale* (CED-D) (Radloff, 1991). Este instrumento está compuesto por cinco ítems que evalúan el grado en que el adolescente ha sentido tristeza y sentimientos depresivos en la última semana. La escala de respuesta es tipo Likert de cuatro alternativas, desde "Menos de un día" hasta "5-7 días". La versión original y la versión breve de cinco ítems resultan válidas y fiables, con alfa de Cronbach = .98

Tabla 1 Características sociodemográficas de los participantes

	Elche (*n* = 999)	Crevillente (*n* = 372)	San Vicente (*n* = 136)	Total (*n* = 1507)
Mujeres, n (%)	492 (49.24)	171 (45.96)	54 (39.7)	717/1507 (47.54)
Edad (años), M (DT)	15.79 (0.79)	16 (0.95)	15.86 (0.91)	15.87 (0.88)
14 años, n (%)	370 (79.05)	82 (17.52)	16 (3.41)	468 (31.05)
15 años, n (%)	330 (69.91)	94 (19.91)	48 (10.16)	472 (31.32)
16 años, n (%)	237 (59.39)	123 (30.82)	39 (9.77)	399 (26.47)
17 años, n (%)	61 (40.13)	67 (44.07)	24 (15.78)	152 (10.08)
18 años, n (%)	1 (9.09)	3 (27.7)	7 (63.63)	11 (1.45)
19 años	0	3 (60)	2 (40)	5 (0.33)
Nacionalidad				
Española	912 (66.66)	332 (24.26)	124 (9.06)	1368 (90.8)
Otra	88 (63.30)	40 (28.77)	11 (7.91)	139 (9.2)
Curso académico				
3.º ESO	428 (81.52)	97 (18.48)	0	525 (34.85)
4.º ESO	303 (68.55)	86 (19.45)	53 (12)	442 (29.32)
1.º PCPI	65 (46.42)	27 (19.28)	48 (34.3)	140 (9.3)
2.º PCPI	17 (25.37)	15 (22.38)	35 (52.25)	67 (4.45)
1.º Bachillerato	166 (68.6)	76 (31.4)	0	242 (16.05)
Grado medio	0	32 (100)	0	32 (2.12)
3.º PDC	15 (55.55)	12 (44.45)	0	27 (1.79)
4.º PDC	17 (53.12)	15 (46.88)	0	32 (2.12)
Convivencia				
Ambos padres	778 (65.6)	306 (25.8)	102 (8.6)	1186 (78.7)
Solo con la madre	127 (69.8)	32 (17.58)	23 (12.63)	182 (12.1)
Solo con el padre	13 (39.4)	15 (45.45)	5 (15.15)	33 (2.2)
Otra	85 (80.25)	15 (14.15)	6 (5.6)	106 (7)
Han fumado alguna vez, n (%)	267 (54.5)	160 (32.65)	63 (12.85)	490 (32.4)
Han fumado en el último mes, n (%)	124 (51.9)	77 (32.21)	38 (15.89)	239 (16.8)

DT: desviación típica; ESO: Educación Secundaria Obligatoria; PCPI: Programa de Cualificación Profesional Inicial; PDC: Programa de Diversificación Curricular.

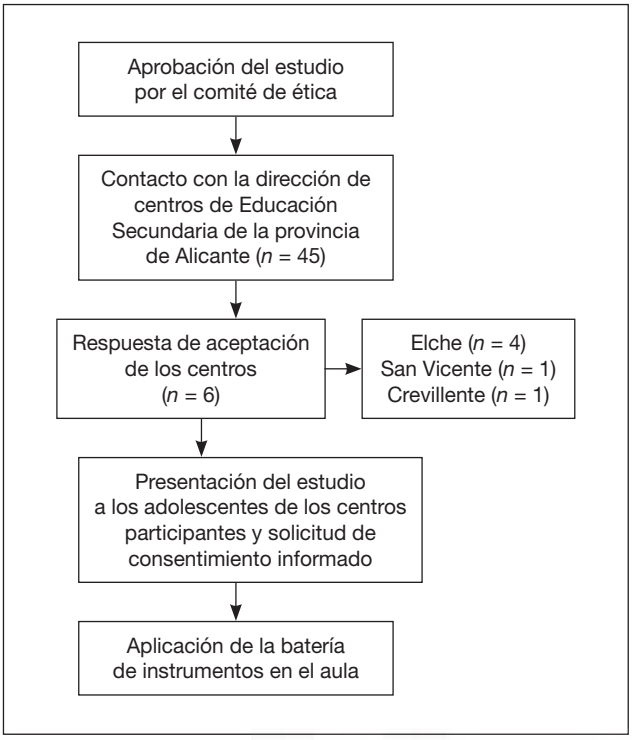

Figura 1 Proceso de reclutamiento de la muestra.

para muestra española (Calvete & Cardeñoso, 1999), además de resultar un instrumento válido para la detección de síntomas ansiosos (Ruiz-Grosso et al., 2012). Para la muestra presentada en este estudio se obtuvo α = .87.

Finalmente, se incluyeron dos ítems para evaluar la conducta de consumo de tabaco alguna vez en la vida y durante el último mes y la frecuencia de consumo diaria, el día previo a la evaluación, en los últimos 7 días y en el último mes.

Procedimiento

Se seleccionaron de forma incidental 45 centros de enseñanza secundaria de la provincia de Alicante (España). Seis de ellos (Crevillente [*n* = 1], Elche [*n* = 4] y San Vicente [*n* = 1]) accedieron a participar en el estudio. Tras la aprobación del estudio por un comité de ética, un investigador acudió a los centros con el fin de presentar el estudio a los adolescentes y aplicar la batería de instrumentos. Durante la presentación se garantizaba el consentimiento informado y la confidencialidad del estudio. La aplicación se realizó a grupos completos (entre 25 y 35 alumnos) durante el horario escolar en el propio centro, dando siempre las mismas instrucciones. Durante toda la aplicación, el experimentador permaneció en el aula para solucionar posibles dudas que pudiesen surgir y favorecer una correcta cumplimentación (figura 1).

Análisis de datos

Se llevaron a cabo análisis de regresión logística. Cuando las variables dependientes eran dicotómicas (haber consumido tabaco o no), se aplicaron regresiones logísticas binarias. En todos los casos se comprobaron los supuestos de aplicación, y no se encontró incumplimiento en ninguno de ellos, siendo especialmente estrictos con la normalidad o la homogeneidad de la varianzas. Además, se realizó un análisis multivariable de la varianza (MANOVA) para identificar si existían efectos significativos del nivel de estado de ánimo en las diferentes variables de frecuencia de consumo de tabaco (cigarrillos diarios, el día anterior, últimos 7 días y último mes). La clasificación de la submuestra en función del estado de ánimo se realizó siguiendo los criterios de Riveros (2004).

Resultados

Diferencias por sexo y edad

En primer lugar, antes de estudiar la relación entre el estado de ánimo y el consumo de tabaco se analizaron las diferencias en la muestra por sexo y edad, con el fin de determinar si era necesario el control de estas variables. En el caso del sexo, había diferencias en el consumo (t(804.9) = 7.98; p < .001): las mujeres presentan mayor consumo de tabaco. En cuanto al estado de ánimo (t(1.466.5) = –5.47; p < .001), se encontraron diferencias por sexo, y el grupo de mujeres obtuvo mayor puntuación. En el caso de la edad, había diferencias significativas (p < .001), con más consumo de tabaco a mayor edad. En función de los resultados obtenidos, se decidió controlar la influencia de estas variables en los análisis posteriores.

Regresión logística en estado de ánimo y consumo de tabaco

En primer lugar, se analizó la capacidad del estado de ánimo predictiva de consumo de tabaco. En la tabla 2 se resu-

Tabla 2 Ajuste de la regresión logística sobre estado de ánimo y consumo de tabaco

	x^2	*gl*	*p*	OR (IC95%)
Consumo de tabaco alguna vez	13.54	1	< .001	27.12 (8.3-47.5)
Consumo de tabaco en el último mes	5.09	1	< .05	10.2 (3.2-17.1)
Consumo diario	2.04	1	< .001	4.05 (0.8-7.4)

gl: grados de libertad; IC95%: intervalo de confianza del 95%; OR: odds ratio.
Variable independiente: estado de ánimo.

Tabla 3 Ajuste de la regresión logística sobre estado de ánimo en la frecuencia de consumo

Estado de ánimo	x^2	*gl*	*p*
Bajo	1.55	1	< .001
Medio	1.38	1	< .001
Alto	9.08	1	< .001

gl: grados de libertad.
Variable independiente: estado de ánimo.

me el ajuste de la regresión logística binaria, en el que se observa que el modelo resulta significativo, tanto en el caso del consumo alguna vez ($p < .001$) como durante el último mes ($p < .05$) y el consumo diario ($p < .001$). Los análisis confirman que hay mayor probabilidad de fumar en presencia de bajo estado de ánimo ($B = 1.17$; $p < .001$).

A continuación se seleccionó únicamente a los fumadores con el fin de analizar la influencia del estado de ánimo en la frecuencia de consumo. La submuestra fue clasificada en tres niveles en función de la frecuencia con que habían sentido tristeza en la última semana: menos de 1 día (alto), 1-2 días (medio) y 3-7 días (bajo). De esta forma, la muestra quedó clasificada en tres grupos según su estado de ánimo: bajo ($n = 51$), medio ($n = 97$) y alto ($n = 339$). En la tabla 3 se resume el ajuste de las regresiones lineales múltiples. Se puede observar que hay influencia del estado de ánimo en los tres grupos, por lo que los modelos resultan significativos ($p < .001$).

Estado de ánimo e intensidad de consumo

Los participantes con mejor estado de ánimo son los que presentan menor intensidad de consumo en todas las variables evaluadas. En la tabla 4 se resume el análisis multivariable de la varianza.

Discusión

Los objetivos de este estudio son examinar el estado de ánimo en adolescentes fumadores y no fumadores, analizar si hay mayor consumo de tabaco en función del estado anímico y, por último, determinar la capacidad del estado de ánimo predictora del consumo de tabaco en población adolescente.

Los resultados confirman las hipótesis de partida, y se observa relación entre el estado de ánimo y el consumo de tabaco, de manera que hay mayor probabilidad de fumar cuando se tiene un estado de ánimo bajo. Este resultado corrobora los de estudios anteriores que encontraron evidencias de la relación entre el estado de ánimo y el consumo de tabaco (Espada et al., 2011; Fernández del Río & Becoña, 2009; Groth & Morrison-Beedy, 2011). En un estudio llevado a cabo por Vázquez et al. (2013), concluyeron que el consumo de tabaco se produce en mayor medida en adolescentes con estado de ánimo negativo, y que este puede motivar el inicio del hábito. El presente trabajo confirma que el estado de ánimo se establece como un factor de riesgo para el inicio del consumo de sustancias, al tiempo que establece su relación con la frecuencia y la intensidad del consumo.

Por otro lado, los resultados del presente estudio confirman que el estado de ánimo es predictor de la frecuencia y la intensidad del consumo de tabaco. Un estudio reciente de Carceller-Maicas et al. (2014) concluye que los jóvenes con síntomas depresivos no fuman en mayor proporción que aquellos que no padecen este tipo de malestar, aunque esta asociación es exclusiva de los chicos y no de las adolescentes. A pesar de que la evidencia es contradictoria, ya que variables como el apoyo familiar y social anulan la relación del consumo con la depresión (Barra, Cerna, Kramm & Véliz, 2006), así como otros factores orgánicos y sociales (Novoa-Gómez, Barreto & Silva, 2012), en nuestra muestra con adolescentes sí existe una influencia significativa, tanto en los chicos como en las chicas. El consumo de tabaco, según Hrubá y Zaloudíková (2010), podría explicarse como una estrategia de los adolescentes para regular sus estados de malestar; sin embargo, en el presente estudio no es posible establecer la dirección de la relación entre el consumo y el estado de ánimo. Cabe destacar que en el presente estudio se ha analizado no solo el consumo ocasional (semanal, mensual, etc.), sino que se ha incluido el consumo diario, ya que, aunque existen investigaciones que indican que la práctica del consumo semanal se convertirá en hábito y, por lo tanto, los adolescentes acabarán siendo fumadores habituales, la mayoría de los estudios optan por analizar el consumo diario con la finalidad de crear una variable lo suficientemente robusta (Martínez-Hernáez et al., 2012), puesto que la evidencia resulta más consistente cuando se analiza el consumo diario (Rubinstein et al., 2011).

Los resultados de este estudio contribuyen a enriquecer el conocimiento sobre la relación entre el estado de ánimo y el consumo de tabaco, aportando datos de población adolescente española y mediante la cuantificación de su capacidad predictiva. A partir de los resultados de este estudio, se confirma la importancia de tener en cuenta los síntomas depresivos a la hora de realizar intervenciones preventivas en esta población.

Tabla 4 Estado de ánimo y frecuencia de consumo

	Bajo estado de ánimo	Medio estado de ánimo	Alto estado de ánimo
Cigarrillos diarios	2.22 (0.983)	2.06 (0.579)	1.64 (0.277)
Cigarrillos el día anterior	1.63 (0.389)	1.38 (0.272)	1.34 (0.594)
Cigarrillos en los últimos 7 días	12.40 (0.965)	10.92 (0.581)	9.65 (0.557)
Cigarrillos en el último mes	50.6 (0.747)	42.6 (0.337)	37 (0.448)

Este estudio tiene algunas limitaciones. En primer lugar, se trata de un estudio transversal en el que se determina como bajo, medio o alto el estado de ánimo en un momento determinado. Es posible que las personas sufran variaciones del estado de ánimo a lo largo del tiempo, sobre todo los adolescentes, que experimentan cambios emocionales bruscos (Ruiz, 2002). En segundo lugar, el consumo adolescente puede estar mediado por el efecto de otras variables que no se han medido y su posible interacción con el estado de ánimo, como es el caso de los estilos de afrontamiento, que pueden estar mediando entre el bajo estado de ánimo y el consumo de tabaco. Por último, a pesar de que los resultados concluyen mayor probabilidad de consumo de tabaco con peor estado de ánimo, la transversalidad del estudio no permite establecer la causalidad de la relación.

A pesar de sus limitaciones, este estudio presenta nuevas evidencias que demuestran la relación entre el estado de ánimo y el consumo de tabaco en adolescentes. Es conveniente que los programas, tanto preventivos como interventivos, evalúen esta variable, puesto que va a actuar como mediadora en su efectividad. El desarrollo de estrategias para analizar los síntomas depresivos y el consumo de tabaco favorecería la implementación de intervenciones mejor sustentadas y que resultarían más efectivas, también en lo que a costes económicos se refiere. Asimismo, dichos programas deben incluir entre sus componentes el entrenamiento de estrategias dirigidas a la búsqueda de soluciones y alternativas al consumo cuando hay problemas en el estado de ánimo de los adolescentes, de modo que dicho entrenamiento actúe como factor de protección tanto del consumo de tabaco como de la frecuencia y la intensidad del consumo.

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OBJETIVO 3

Evaluar la eficacia a corto y largo plazo de un programa para el tratamiento y la prevención del consumo de tabaco

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ESTUDIO 3

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Pilot clinic study of Project EX for smoking cessation with Spanish adolescents

José P. Espada[a], María T. Gonzálvez[a], Mireia Orgilés[a], Alejandro Guillén-Riquelme[a], Daniel Soto[a] & Steve Sussman[b]

[a]*Universidad Miguel Hernández* (Spain)

[b]*University of Southern California* (USA)

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Pilot clinic study of Project EX for smoking cessation with Spanish adolescents

José P. Espada [a,*], María T. Gonzálvez [a], Mireia Orgilés [a], Alejandro Guillén-Riquelme [a], Daniel Soto [b], Steve Sussman [b]

[a] Miguel Hernández University, Spain
[b] University of Southern California, United States

HIGHLIGHTS

- We evaluated a tobacco use cessation program, Project EX, in Spanish adolescents.
- The experimental pilot trial included 3 data collection points (n = 211).
- At immediate posttest, Project EX increased intention to quit smoking.
- At immediate posttest, Project EX reduced future nicotine dependence scores.
- At 6-month follow-up, higher quit rates were found in the intervention group.

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ABSTRACT

Introduction: Despite efforts to prevent smoking, the prevalence of smoking in Spanish adolescents remains high. So far, there are no evidence-based smoking cessation programs for adolescents in Spain.
Methods: This study describes the evaluation of Project EX, an eight-session school-based clinic smoking cessation program, with Spanish cigarette smokers 13–19 years of age, from 9 schools (four program condition schools and five control condition schools). A group-randomized controlled trial was used. There were 211 smokers at baseline (112 program group, and 99 control group). Evaluation involved an immediate pretest and posttest survey (administered five-weeks later) and six-month follow-up (after the immediate posttest).
Results: At immediate posttest, Project EX significantly reduced future nicotine dependence scores (mFTQ; $p < .001$), and increased intention to quit smoking ($p < .001$), and led to a higher previous day (prior to assessment) quit rate ($p < .03$). At the six-month follow-up, the percentage of quitters in the program group was 14.28%, whereas no smokers quit smoking in the control group ($p < .04$), and Project EX had a significant influence on future smoking expectation ($p = .006$) and overall level of 30-day smoking.
Conclusions: Results for the Project EX school-based clinic are promising for adolescent smokers in Spain, although difficulties in recruitment and high attrition are of concern. Findings and limitations are discussed and suggestions for future research are suggested.

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1. Introduction

Cigarette smoking is the cause of death of up to 50% of regular smokers, and passive smoking is a leading cause of death to children and adult nonsmokers who are exposed to smoking (World Health Organization, 2013). Cigarette smoking is the second most misused substance (after alcohol) among Spanish students aged 14 to 18 years, according to the latest data from the National Drug Plan (Spanish Drugs Observatory, 2013). The prevalence of youth who have ever smoked is 35.3% and the average age of the first use of tobacco is 13.6 years, with higher prevalence among girls (37.5%) than boys (33.1%). The prevalence of regular smoking among Spanish adolescents is 12% for boys and 13.1% for girls. Despite efforts to prevent smoking, its prevalence is still very high in Spain (EMCDDA, 2014).

Teens most likely begin to lose autonomy over tobacco use on the first or second day of smoking initiation (Gervais, O'Loughlin, Meshefedjian, Bancej, & Tremblay, 2006). Tobacco dependence can be pre-daily habit, typically appearing before the consumer regularly smokes two cigarettes per day (DiFranza et al., 2007), and is associated with depressive symptoms in Spanish adolescents (Espada, Sussman, Huedo-Medina, & Alfonso, 2011).

* Corresponding author at: Department of Health Psychology, Miguel Hernández University, Av. de la Universidad, s/n, 03202 Elche (Alicante), Spain. Tel.: +34 96 665 83 44; fax: +34 96 6658904.
E-mail address: jpespada@umh.es (J.P. Espada).

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The effectiveness of smoking cessation for Spanish adults is supported by reviews, meta-analysis and guidelines (e.g., Becoña, 2004), and relevant empirical work (Becoña, 2006; Sancho, 2003). Encouragingly, a study involving a cost-effective analysis of a school-based teen smoking cessation program (delivered in the United States) suggested that the program was more cost-effective than adult tobacco use cessation programs (Dino, Horn, Abdlkadri, Kalsekar, & Branstetter, 2008). However, currently, there is no evidence for the effectiveness of cessation programs among adolescent smokers in Spain. Relativity few studies of teen smoking cessation have been conducted worldwide compared to adult cessation programs and only 25% of these studies have been conducted outside the United States (Sussman, 2012). Although there are studies that reviewed the prevalence of smoking cessation in retrospective reports, establishing a naturally-occurring cessation rate of 30% (which may include very light experimental smokers in the calculations, Villalbí, Rodríguez-Sanz, Villegas, & Borrell, 2009), there have been no controlled trials of adolescent smoking cessation in Spain. Thus, an effective cessation tobacco program is urgently required.

Project EX was developed in the United States (California) and has been selected as an evidence-based program by several National-level health agencies (e.g., NREPP/SAMHSA, NCI, Health Canada). The program is derived from a theoretical model of smoking in adolescence, which emphasizes the role of motivational factors, personal skills, and coping with withdrawal (Sussman et al., 2004). The results of controlled studies on the Project EX clinic program in the U.S. are consistently positive. Approximately 17% last 30-day quit rates have been found in the program condition at a 3–6 month follow-up, which generally has doubled rates of quitting compared to a control condition (Sussman, 2012; Sussman, Dent, & Lichtman, 2001; Sussman et al., 2004).

In order to evaluate the efficacy of the program in other cultures where motivations for quitting smoking may differ from the U.S., the program was implemented and evaluated in several other countries (Sussman, 2012). The first international pilot study completed was in Wuhan, China (Zheng et al., 2004). The clinic program was evaluated through the use of a multiple baseline design. The naturally-occurring (control) quit rate was 3%, whereas the program condition intent-to-treat 30-day quit rate was 11% at a four-month follow-up. The program was rated as very helpful. The Bashkortostan (Russia) study was the second international pilot study of the Project EX clinic program (Idrisov et al., 2013). An intent-to-treat 30-day quit rate of 7.5% versus 0.1% at a six-month follow-up was revealed in that study. The present study is the third international trial of the Project EX school-based clinic program and the first controlled school-based clinic trial of teen tobacco use cessation conducted in Spain, specifically in the Southeast (Valencia and Murcia). The present study describes the recruitment, implementation, immediate outcomes, and 6-month outcomes of Project EX with Spanish adolescents. We hypothesized that the program would demonstrate a higher quit rate compared to standard care over a six-month follow-up using an experimental design.

2. Methods

2.1. Recruitment and experimental design

We contacted a convenience sample of 73 schools from 22 towns in the provinces of Alicante and Murcia in the Southeast of Spain. After a first meeting to present to the school boards the objectives of the intervention, 11 schools reported being willing to participate. These schools were randomly assigned to either the program condition or a standard care control condition (students at control group remained on the waiting list. When the program finished in the program group and all evaluations were completed, control group students received the program). There were two program condition schools that we thought we had recruited. We did initially engage staff support, consented students, and did a pretest assessment. In one of the schools, participants completed Session 1 with 26 smokers. However, all staff and all students but two withdrew support from the program after the first session due to a concern to meet academic priorities and overall lack of interest in the program. At the other school, three students carried out the pretest assessment, but did not even start the Project EX sessions. Due to the unusual nature of the relations with these two schools, these cases were not included in the study (there was no reason to believe that these two schools' non-participation would influence our findings). Thus, we considered the total recruitment n = 9 schools (12.3% of those schools approached), four in program condition and five in control condition.

The reasons for non-recruitment of schools were no response after the single, initial contact (56%), responded back to us after a first meeting with a statement of no staff interest (34%) and no interested student smoker participants after visiting the school and attempting to recruit smokers (10%; this included the two schools just mentioned). The participants were recruited by means of announcements at class, scholar broadcasting stations (school-based radio stations that can broadcast on a signal receivable at school or home), and advertisements in the classroom and in the school hallways (posters in classrooms and handouts).

Subject-level inclusion criteria included adolescent cigarette smokers 13–19 years of age, having had a cigarette in the last 30 days at baseline, having joined the clinic in the first two of the six weeks (on or before Session 4), and reporting being willing to attend the school-based clinic program. An e-mail address was provided to potential participants so that they might confidentially contact the researcher for further information or to join the program.

2.2. Project EX curriculum

The Project EX clinic program involves eight sessions. During the first four sessions, students are prepared to strengthen their resolve to quit tobacco use. The second four sessions are focused on quit-attempts. The curriculum involves use of four talk show enactments of different smoking cessation issues (i.e., “family and friends confront smokers about their habit”, “your cigarettes may be stressing you out”, “quitting smoking: I've been there and it does get better”, and “warning: waiting to quit smoking may be hazardous to your peace of mind”), four alternative medicine techniques (“healthy breathing”, “yoga activity”, “letting feelings pass” meditation activity, and a “relaxation activity”), a homework assignment in which smokers notice the effects of not cigarette smoking on them, a competitive game about passive smoking (“is smoking on the menu?”), and tobacco consequences, and quit and maintenance strategies (e.g., coping, anger management). Smokers can make personal commitments to quit. The curriculum is described in more detail in Sussman, Dent, and Lichtman (2001).

2.3. Translation and cultural adaptation

The original version of the curriculum was provided by the Project EX team at the University of Southern California (USC). It was translated into Spanish by two translators. These same two bilingual researchers at University Miguel Hernández (UMH) then checked the translation by reading both the English and Spanish versions. The Spanish version was pilot-tested in one focus group composed of ten youths at UMH in Spain before the program implementation to verify that the program material was clearly understood and culturally appropriate.

In addition to language adaptations, five major changes were made in the curriculum to adapt it to Spanish culture. First, the original curriculum targets “tobacco” use including smokeless tobacco, pipes, cigars, and chewing tobacco. Spanish adolescents very rarely use other forms of tobacco than cigarettes (Meneses et al., 2013; Spanish Drugs Observatory, 2013), so that information was removed and the program focused on cigarette smoking. Second, when Project EX was implemented in the United States, extrinsic motivators were

provided as incentives. Students in most implementations were told that they would obtain elective credits for participating in the program. In addition, participants received class release time to participate in the program (i.e., they did not have to stay after school.) In Spain, as in other international settings within which Project EX is being implemented (Idrisov et al., 2013; Sussman, 2012), there were no incentives for attending at the program sessions. Third, all names of characters in the talk shows (see Sussman, 2012) were changed from American to Spanish names. Fourth, the monetary amounts were changed from dollars to euros (e.g., in Session 1, regarding the amount of money spent per year if one smokes one pack of cigarettes per day). Finally, in Session 3, "Health Dangers of Tobacco Use", there is a question list for a game in the original curriculum, pertaining to second-hand smoke and policies. Questions and forced-choice responses were changed to reflect policies in Spain. For example, one question asks "In which of the following places is it legal to smoke in the United States? ('Airline flight,' 'Interstate bus,' 'New York City taxi cab,' and 'None of the above')". This item was replaced with "In which of the following places is it legal to smoke in Spain? ('Airport,' 'Bus station,' 'Taxis,' and 'None of the above' [correct answer])".

2.4. Participants

Participants were 211 students in the cities of Alicante and Murcia, Spain, located in the South East region of Spain and with a population of approximately two million and an area of more than 5800 km^2. The sample was a representative of the adolescent Spanish population in percentage for gender and age. Participants were randomly assigned to one of two experimental conditions (99 in the control condition and 112 in the program condition). Participants and their parents provided written informed assent and consent, respectively, to participate in this study. Parents were told only that their children would participate in a study on health promotion, including tobacco education. The assessment was carried out during the first meeting, in small groups (ns = 5-to-10). Among the 211 subjects that participated in the pretest survey, 128 (51 in the control condition and 77 in the program condition) also completed immediate post-program questionnaires (60.7% retention rate) and 100 (65 in the control condition and 35 in the program condition) completed six-month follow-up questionnaires (47.4% retention rate).

Adolescents in the control condition received no formalized intervention classes, materials, or programs and were surveyed at each time point. When the program finished in the program group and all evaluations were completed, control group students received the program (as a wait-list control).

Participants varied in age from 14 to 19 years ($M = 16.4$; $SD = 1.38$), at pretest. The sample was 46.7% male; 91% Spanish, and 9% other nationality (North Africa, Central Europe, and South America). Further, 72.9% of the students lived with both parents.

2.5. Training in Project EX

An initial, eight hour training was conducted at USC for the Spanish research team in charge of the adaptation of Project EX, to guide the translation, cultural adaptation, and implementation. Then a second training seminar of eight hours was scheduled for 11 graduate psychology students, at UMH. These students were given the opportunity to become a program facilitator. All volunteers received an introductory lecture about Project EX, which included a brief summary of the Project EX curriculum, its history, advantages of using the program, and the role of program facilitators. Six graduate students (all female; mean age = 24 years old) were interested in implementing the program. These facilitators received extra training during two meetings of two hours each after studying and practicing the eight sessions of Project EX during a two-day workshop led by the program developer (Dr. Steven Sussman) and Project EX health educator (Daniel Soto, MPH), including learning details of program delivery and how to deliver the material with fidelity.

2.6. Implementation, data collection and measures

The clinic program was delivered in classrooms over a five-week period. For the first three weeks of the clinic delivery, two clinic sessions were delivered each week. One clinic session was held each week over the subsequent two weeks. The sessions were held after-school hours. Paper-and-pencil pretest and posttest questionnaires were administered in the beginning of the first session and one day after the completion of the eight program session. A follow-up assessment was conducted approximately six months after the last session. This pilot study was approved by the Ethics Committee of Miguel Hernández University. Data were collected by the same persons who had delivered the program to specific clinic groups. Data were collected at pretest just prior to Session 1, five weeks later (at an immediate posttest in the program condition; with the same time lag in the control condition), and then six months after the posttest. Attempts were made to help maintain confidentiality of the responses by placing completed questionnaire into sealed envelopes, relaying to youth that only the data analyst at UMH would see their responses and telling youth that their data would be entered via a code number rather than by name.

Questionnaires took approximately 20 min to complete. Demographic items included age (in years), gender, nationality (born in Spain, or immigrated to Spain from another country), and current living situation (with parents, live alone, other situation). Receptivity to the program was measured by two types of measures (see Sussman, Dent, & Lichtman, 2001). Eight items assessed program quality across sessions: "How helpful was the class for quitting smoking?", "How interesting was the class?", "How much did you like the class?", "How informative was the class?", "How well organized was the class?", "How much did you learn in the class?", "How enthusiastic was the health educator?", and "How well informed was the health educator?". Clinic participants were asked to rate these items on a scale of 1 ("not at all") to 10 ("extremely"). As in previous work (e.g., Sussman, Dent, & Lichtman, 2001), these adjectives were highly inter-correlated (Cronbach's $\alpha = .80$ for the current study); thus, ratings across the items were averaged to comprise a perceived program quality index. In the second measure, participants rated how much they liked each of the key EX curriculum activities (8 total activities; from 1 = "terrible" to 10 = "excellent"). The activities included 1) Talk Show: Those Dirty Smokers-Family and Friends Confront Smokers About Their Habit, 2) Talk Show: Cigarettes May be Stressing You Out, 3) Healthy Breathing, 4) Game: Is Smoking on the Menu?, 5) Talk show: Quitting Smoking: I've Been There and It Does Get Better, 6) Yoga, 7) Meditation, and 8) Talk Show: WARNING! Waiting to Quit Smoking may Be Hazardous to Your Peace of Mind. These activity likeability items were averaged to get an overall impression of the program activities (Cronbach's $\alpha = .89$ for the current study).

Smoking behavior (previous day) was assessed by means of an open-ended question "How many times have you used cigarettes yesterday? (0 to 100+ times)", which was the outcome measured at the posttest. Smoking behavior (past month) was assessed by means of an open-ended question "How many times have you used cigarettes in the last month (30 days)? (0 to 100+ times)", which was the outcome measured at the 6-month follow-up. To assess intention to quit, students were assessed with the question "Do you think you will ever quit smoking cigarettes?", with response categories being "0: I never smoke cigarettes", "1: Yes, I already have", "2: Yes, I will sometime in the future", "3: Yes, I will in the next few weeks", "4: Maybe", and "5: No". Smoking expectation was assessed with the question "How likely is it that you will smoke cigarettes in the next 12 months?", with response categories being "0: Definitely not", "1: Probably not",

"2: A little likely", "3: Somewhat likely", and "5: Very likely". Motivation to quit was assessed with the question "How much do you want to quit smoking now and/or stay smoke-free?", with response categories being "1: A lot", "2: Somewhat", "3: Slightly", and "4: Not at all". The level of nicotine dependence was assessed with the 8-item modified Fagerström Tolerance Questionnaire (mFTQ) (Idrisov et al., 2013; Prokhorov, Pallonen, Fava, Ding, & Niaura, 1996; Prokhorov et al., 2000). Nicotine dependence was dichotomized into no or low (0–5) and high (6–9) levels.

2.7. Data analysis

We used chi square, Phi, and Cramer's V to analyze attrition. Variables included school, age, gender, program condition, nationality, whether or not participant lives with both parents, last 30-day cigarette smoking, future smoking expectation, intention to quit, motivation to quit, and mFTQ (dichotomized into low and high nicotine dependence). The analysis of attrition was performed across conditions (stayers versus leavers; external invalidity) and regarding the interaction between condition and each one of the related variables (internal validity).

Data analysis for program effects was completed with multi-level mixed analysis, by using the package *nlme* (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2014) from the *R* statistical program. In these analyses condition was considered as a fixed variable (program group compared to control group). School was considered as a random factor. With these specifications we can control the intra-class correlation (of schools nested within condition) between scores at pre-test and post-test or follow-up. Variables adjusted for in the analyses included baseline measurements for the outcomes variable that was examined in the specific analysis, age, gender, and propensity for attrition at immediate posttest or six-month follow-up. The propensity for attrition score was calculated from a model predicting the actual attrition status with pretest measures (Berger, 2005). The pretest measures in the attrition propensity prediction models included school, age, gender, study condition, nationality, whether or not living with both parents, intention to quit smoking, future smoking expectation, motivation to quit, last 30-day cigarette smoking, and mFTQ for self-reported nicotine dependence level. The outcome variables analyzed were: smoking yesterday (at the immediate post-test only; to minimize contaminating cessation with continuing to receive program content), last 30-day cigarette smoking (at the 6-month follow-up only), future smoking expectation, intention to quit, motivation to quit, and mFTQ scores. We performed the analysis independently for posttest and follow-up. Cohen's d effect sizes for each variable were calculated. Finally, for the quit analysis we used the Fisher exact test without to control any variable.

3. Results

3.1. Assessment of attrition bias at posttest and six-month follow-up

First, the influence of demographic variables and each outcome variable were examined for attrition across conditions (external validity). Two separate analyses were performed. The first one examined attrition at the immediate posttest. Of the total initial participants, the sample lost was 83 of 211 (39.3%). The attrition analysis revealed statistically significant differences in school ($p = < .001$). At six-month follow-up 111 participants were lost (52.6% attrition). School was found to be significantly different across attrition status ($p < .001$). Also, last 30-day cigarette smoking was statistically significant ($p < .001$). Students who dropped out reported an average consumption of 200 cigarettes per month ($SD = 186$) at baseline, while participants that were surveyed at six-month follow-up reported an average consumption of 154 cigarettes per month at baseline ($SD = 172$).

Finally, the attrition analysis comparing conditions (internal invalidity) was completed. The percentage of subjects at posttest that dropped out of the study was similar across conditions ($\chi^2(1) = 0.1$; $p = .75$). Also, at posttest there were no differences across conditions on any of the demographic or outcome variables. At six-month follow-up, the attrition analysis revealed statistically significant differences across experimental conditions. The program group exhibited 68.7% of attrition, whereas the control group exhibited 34.3% of attrition ($\chi^2(1) = 36.32$; $p < .001$). However, no significant condition interaction effects were found for demographic or outcome variables.

3.2. Likeability ratings of Project EX

The average satisfaction of adolescents with the program (perceived program quality; eight items on a scale of 1–10) was 7.5 ($SD = 0.76$). The average likeability rating of the program activities (response scale from 1–10) was 7.5 ($SD = 0.58$). The three activities that were most liked, and did not differ from each other, included *Healthy Breathing* ($M = 8.2$; $SD = 2.1$), *Meditation* ($M = 8.0$; $SD = 2.5$) and the *Is Smoking on the Menu Game* ($M = 7.8$; $SD = 2.2$). In fact, the two alternative medicine activities were significantly more liked than all others except the game, whereas the game was significantly more liked than two of the talk shows (*Those Dirty Smokers* and *Quitting Smoking*). Conversely, the talk show "*Those Dirty Smokers: Family and Friends Confront Smokers about Their Habit*" was the least valued activity ($M = 6.8$; $SD = 2.6$), significantly lower than all activities except two of the talk shows (*Quitting Smoking* [$M = 7.1$; $SD = 2.3$] and *Warning* [$M = 7.5$; $SD = 2.5$]) and *Yoga* ($M = 7.3$; $SD = 2.8$). One other talk show, *Cigarettes May Be Stressing You Out* ($M = 7.4$; $SD = 2.4$) was rated as less liked than *Healthy Breathing* and *Meditation*, but was rated as more liked than the *Those Dirty Smokers* talk show, and did not differ from the others.

3.3. Program effects at immediate posttest

In the program condition, the percentage of quitters who indicated they did not smoke on the previous day prior to the assessment was 3.9% (i.e., 5 smokers quit), and there was no adolescent who stopped smoking in the control group (Fisher's exact test: $p = .03$). The program group showed a net effect of one cigarette less in level of smoke in the previous day of evaluation ($p = .154$; pretest: control

Table 1
Immediate posttest program effects[a].

	Control (N = 51)	Program (N = 77)	Net effect	
	Posttest–pretest	Posttest–pretest	Posttest–pretest	*d*
	Δ ± se	Δ ± se	Δ ± se	
Future smoking expectation[b]	−0.02 ± 0.19	0.45 ± 0.15**	0.47 ± 0.12*	.33
Intention to quit	−0.45 ± 0.23	0.77 ± 0.23***	1.22 ± 0.17***	.65
Motivation to quit[b]	0.06 ± 0.2	0.15 ± 0.11	0.09 ± 0.11	.08
mFTQ Nicotine Dependence [c]	−0.08 ± 0.15	0.51 ± 0.13***	0.59 ± 0.10**	.39
Number of cigarettes in the last day (Active smokers only; n control = 51, n program = 72)	−1.24 ± 6.22	−2.10 ± 6.9	0.96 ± 0.16	.02

Notes:
[a] Adjusted for the specific outcome assessed at baseline, age, gender, and school for attrition center is modeled as a random effect.
[b] Reversed score.
[c] Modified Fagerström Tolerance Questionnaire reversed score.
* $p < .05$, two-tailed.
** $p < .01$, two-tailed.
*** $p < .001$, two-tailed.

mean = 6.84, *SD* = 6.21, program mean = 7.3, *SD* = 6.43; posttest: control mean = 5.57, *SD* = 4.74, program mean = 5.21, *SD* = 6.41).

The other program outcome effects at immediate posttest were evaluated, as shown in Table 1. The intervention elicited a greater decrease in future smoking expectation ($d = .33$; $p < .01$), and elicited greater intention to quit ($d = .65$; $p < .001$), lower mFTQ scores ($d = .39$; $p < .001$), and marginally higher motivation to quit smoking scores ($d = .08$; $p = .07$).

3.4. Program effects at six-month follow-up

The 30-day intent-to treat smoking quit rates for each condition was calculated. In the program condition the percentage of quitters was 4.9% (i.e., 6 smokers quit; Fisher's exact test: $p = .06$), and there was no adolescent who stopped smoking in the control group (Fisher's exact test: $p = .04$). Table 2 shows the variability of the dependent variables evaluated for program and control groups. Project EX demonstrated a relatively greater influence on future smoking expectation ($d = .41$; $p = .006$), mFTQ ($d = .26$; $p < .01$), and in number of cigarettes in the last 30 days ($d = .03$; $p = .022$; pretest: control mean = 138.2, *SD* = 176.86, program mean = 193.11, *SD* = 174.68; follow up: control mean = 111.84, *SD* = 180.35, program mean = 84.23, *SD* = 122.96).

4. Discussion

Rates of adolescent smoking in Spain indicate the need for evidence-based tobacco use cessation programs. No previous programs have been completed with Spanish adolescents. Project EX is showing an ability to be adaptable in different countries, with few modifications. In the present study, the Project EX cessation program was translated to Spanish and adapted slightly for the Spanish culture.

Participants who received the program reported statistically significant greater intention to quit. These results are consistent with the last Project EX pilot study in Russia (Idrisov et al., 2013). Furthermore, in this study, participants at program group reported lower future smoking expectation at posttest. In the control group, no adolescents quit smoking at posttest. At six-month follow-up participants in the program group revealed lower future smoking expectations and nicotine dependence, and 14.28% quit smoking (again no one in the control group quit). These results also were significant. Reduction in level of previous-day smoking at immediate posttest and 30-day smoking at 6-month follow-up also was significant. These results indicate that Project EX as a cessation program has the potential effects for smoking cessation among adolescents in Spain.

Interestingly, the activity that was most liked in Spain, particularly *Healthy Breathing*, was the least liked in Russia (Idrisov et al., 2013). Conversely, the activity that was most liked in Russia, the talk show on smoking and stress, was among the least liked activities in Spain. Thus, there appear to be cultural differences in preferences for components for Project EX. Future research should attempt to try to understand why such differences exist.

Still, there are several major limitations and related needs for future research. First, this was a pilot study using a relatively small sample. The promising results of this study indicate that future research on tobacco use cessation programming in Spain is needed with larger sample sizes and in other regions of the country, and to include other socioeconomic and cultural variables for to analyze possible efficacy differences between original program and Spanish adaptation for cultural aspects. Our initial sample is not unlike that of other pilot studies (e.g., Idrisov et al., 2013; Zheng et al., 2004). Also, we do provide an intent-to-treat analysis for cessation, which accounts for attrition, and while we do account for threats to external and internal validity statistically, we do acknowledge the limitations of our sample size. Larger trials are needed.

Second, the dropout rate at posttest was 39.3% and at six-month follow-up was 52.6%. We did make at least three attempts per school to collect posttest and six-month follow-up data, suggesting to us that higher follow-up rates would be difficult to obtain. Student absentees accounted for most of the non-completion. In addition, though, for those students who we could not reach at the schools, we made five attempts to telephone them. Only 10% of calls were answered (90% of the phone numbers were incorrect, were turned off, or were not answered). Certainly, there was lack of general readiness to be involved in cessation programming, indicated by the percentage of schools that agreed to be involved initially, and the groups of young smokers that dropped out before the program even started or after the first session, as well as a rather high attrition rate. In addition, implementation was held after-school times, and participants didn't receive any material incentive for participating, which may lead to a general lack of readiness on the part of the students. This dropout rate makes it difficult to totally know the intervention effect. To control this we have reported intent-to-treat data, assuming that dropouts were still smoking. However, the attrition rate made it difficult to generalize the results. As a result, it may be beneficial to obtain written support from participating schools and offer to share study results with school representatives in order to ensure high retention rates. Providing coupon-based incentives can be an effective approach to encourage positive behavior and is commonly used as response-contingent reinforcement in school. A previous study suggested that appropriate shaping by reinforcing initial attempts to quit can also improve the efficacy of smoking-cessation programs for people who are difficult to treat (Lamb, Kirby, Morral, Galbicka, &

Table 2
Six-month follow-up program effects[a].

	Control (N = 65)	Program (N = 35)	Net effect	
	6-month-pretest	6-month-pretest	6-month-pretest	d
	Δ ± se	Δ ± se	Δ ± se	
Future smoking expectation[b]	−0.09 ± 0.17	0.48 ± 0.24*	0.64 ± 0.14*	.41
Intention to quit	−0.47 ± 0.19	0.85 ± 0.38	1.07 ± 0.19**	.74
Motivation to quit[b]	−0.04 ± 0.15	−0.12 ± 0.23	−0.02 ± 0.12	.06
mFTQ Nicotine Dependence [c]	0.23 ± 0.16	0.57 ± 0.24**	0.38 ± 0.13	.26
Number of cigarettes in the last 30 days (Active smokers only; n control = 65, n program = 32)	−26.25 ± 147.61	−58.88 ± 148.82*	−32.63 ± 148.31***	.03

Notes:
[a] Adjusted for the specific outcome assessed at baseline, age, gender, and school for attrition center is modeled as a random effect.
[b] Reversed score.
[c] Modified Fagerström Tolerance Questionnaire reversed score.
* $p < .05$, two-tailed.
** $p < .01$, two-tailed.
*** $p < .001$, two-tailed.

Iguachi, 2010). Furthermore, incentives may support the motivation of students to quit smoking and reward their efforts when they quit smoking (Cahill & Perera, 2011). Use of coupon-based incentives should be considered to reduce dropout rates in the future. The results were still meaningful as we reported intent-to-treat data, assuming that dropouts were still smoking.

Third, future trials may be strengthened by the use of biochemical validation of nicotine use, because it is possible that an 11% decrease in self reporting of abstinence could occur as a function of use of biochemical validation (Sussman, Dent, & Lichtman, 2001). With the use of CO biochemical validation, Sussman, Lichtman, and Dent (2001) found abstinence rates to decrease from 19% to 17% in the program condition and 10% to 8% in the control condition. Finally, future studies might assess the use of other tobacco products in Spain. For example, while almost all tobacco use among adolescents has been cigarette smoking, marketing of electronic cigarettes is aggressively occurring.

Finally, changes made to the program were "surface" changes, as in previous international trials of Project EX (Sussman, 2012). Resnicow, Soler, Braithwaite, Ahluwalia, and Butler (2000) described surface structural modifications, which involve matching materials and messages to superficial characteristics of population. Adaptations include making the program contents more palatable and readily accessible to this population. Sometimes, however, when implementing replications of programs in foreign countries, cultural (deep structure) adaptations sometimes are required (Kumpfer, Alvarado, Smith, & Bellamy, 2002; Resnicow et al., 2000). We are not clear what sorts of changes would be made in Spain. The program content was pilot-tested in one focus group composed of ten youths at UMH in Spain before the program implementation to verify that the program material was clearly understood and culturally appropriate. As the result of that focus group we didn't consider making deep structure changes. The youths did not see that as necessary. However, we could have entertained more focus groups to probe more deeply. This could be a topic for future work.

Despite limitations of this study, there have been no evidence-based approaches previously evaluated in Spain for adolescent smoking cessation. The results of the present study suggest that Project EX can be used as an effective tobacco use intervention for adolescents in Spain.

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Contributors

All authors contributed to the writing and data analysis processes during the preparation of this manuscript.

All authors have read and approved of this manuscript.

Conflict of interest

There are no conflicts of interest to report.

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ESTUDIO 4

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One-year effects of Project EX: A smoking intervention pilot program with Spanish adolescents

José P. Espada[a], María T. Gonzálvez[a], Mireia Orgilés[a] & Steve Sussman[b]

[a]*Universidad Miguel Hernández* (Spain)

[b]*University of Southern California* (USA)

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One-year effects of Project EX: A smoking intervention pilot program with Spanish adolescents

José P Espada[1], María T Gonzálvez[1], Mireia Orgilés[1] and Steve Sussman[2]

Abstract

Adolescent smoking is a major public health problem, which has led to the development of cessation programs such as Project EX. However, there is no evidence for the long-term efficacy of cessation among Spanish adolescents. This study provides a 1-year follow-up evaluation of the Project EX tobacco use cessation program among 211 smokers. The intent-to-treat 30-day smoking quit rate for the program group was 7.81 percent ($p = .04$), whereas no smokers quit in the control group ($p = .02$). The intervention had a significant influence on future smoking expectation, intention, motivation to quit, and overall level of 30-day smoking. Long-term outcomes of the Project EX clinic-based program are promising for adolescent smokers in Spain.

Keywords

intervention, Project EX, smoking cessation, Spain, tobacco

Introduction

Adolescent smoking is a major public health problem (Audrain-McGovern et al., 2014), and although youth often hope they will quit soon, the addictive nature of nicotine leads many to continue smoking for decades (Ariza et al., 2014). In western countries, more than half of school children have tried tobacco during high school. In the United States, almost 90 percent of new smokers tried their first cigarette before the age of 18 years (Centers for Disease Control and Prevention (CDC), 2012), and in Europe, 54 percent of 15-year olds have smoked cigarettes at least once in their lifetime, with more than half of lifetime smokers having smoked cigarettes in the last 30 days (Hibell et al., 2012). According to the latest data from the National Drug Plan (Spanish Drugs Observatory, 2013), the prevalence of regular smoking in Spain is 12 percent for boys and 13.1 percent for girls.

Compared to adult cessation programs, there have been relatively few studies of teen smoking cessation conducted worldwide, and only 25 percent have been conducted outside the United States (Sussman, 2012). In Spain, there is no published evidence for the long-term efficacy of cessation programs among adolescent smokers.

Project EX was developed in the United States (California) and has been selected as an evidence-based program by several national-level health agencies (e.g. National Registry of

[1]Miguel Hernández University, Spain
[2]University of Southern California, USA

Corresponding author:
María T Gonzálvez, Department of Health Psychology, Miguel Hernández University, Avenida de la Universidad, s/n. 03202 Elche (Alicante), Spain.
Email: mgonzalvez@umh.es

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Evidence-Based Programs and Practices (NREPP)/Substance Abuse and Mental Health Services Administration (SAMHSA), National Cancer Institute (NCI), Health Canada). The program is derived from a theoretical model of smoking in adolescence, which emphasizes the role of motivational factors, personal skills, and coping with withdrawal (Sussman et al., 2004). The results of controlled studies on the Project EX clinic program in the United States were consistently positive. At a 3- to 6-month follow-up, last 30-day quit rate was approximately 17 percent in the program condition, which generally doubled quitting rates compared to the control condition (Sussman, 2012; Sussman et al., 2001, 2004).

In order to evaluate the efficacy of the program in other cultures where motivations for quitting smoking may differ from the United States, the program was implemented and evaluated in several other countries (Sussman, 2012). The first international pilot study completed was in Wuhan, China (Zheng et al., 2004), and the clinic program was evaluated by using a multiple baseline design. The naturally occurring (control group) quit rate was 3 percent, whereas the program condition intent-to-treat 30-day quit rate was 11 percent at a 4-month follow-up. The program was rated as very helpful. The second international pilot study was the Bashkortostan (Russia) study (Idrisov et al., 2013), which presented an intent-to-treat 30-day quit rate of 7.5 percent versus 0.1 percent at a 6-month follow-up. The third international trial of the Project EX school-based clinic program was developed in Spain (Espada et al., 2015). At immediate posttest, Project EX significantly reduced future nicotine dependence scores, increased intention to quit smoking, and led to a higher previous day (prior to assessment) quit rate. At the 6-month follow-up, 14.28 percent had quit smoking in the program group, whereas there were no quitters in the control group. Also, Project EX had a significant influence on future smoking expectation and the overall level of 30-day smoking. This was the first controlled school-based clinic trial of teen tobacco use cessation conducted in Spain, but its long-term efficacy is unknown.

This article focuses on the 1-year self-reported behavioral outcomes of the Project EX cessation program with Spanish adolescents. The variations in sustained use or cessation are observed in the long term (Dijk et al., 2007), so we hypothesized that the program group would show that the effects of the program are maintained in the whole sample at 1-year follow-up, which would bolster the practical importance of its effects in Spain.

Method

Recruitment and experimental design

We used a convenience sample of 73 schools from 22 towns in the Southeast of Spain. After the first meeting to present the intervention objectives to the school boards, a total of nine schools (12.3% of the schools approached) reported being willing to participate. The recruited schools were randomly assigned to one of two experimental conditions: control group and program group. The students in the control group remained on the waiting list. When the program finished in the program group and all evaluations were completed, control group students received the program. There were four schools in program condition and five in control condition.

The reasons for non-recruitment of schools were as follows: no response after a single initial contact (56%), responded back to us after a first meeting with a statement of no staff interest (34%), and no student smokers interested in participating after a visit to the school and an attempt to recruit smokers (10%).

Subject-level inclusion criteria included adolescent cigarette smokers of 13–19 years old, having had a cigarette in the last 30 days at baseline, having joined the clinic in the first 2 of the 6 weeks (on or before Session 4), and reporting to be willing to attend the school-based clinic program. An e-mail address was provided to potential participants so that they might

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confidentially contact the researcher for further information or to join the program.

Project EX curriculum

The Project EX clinic program involves eight sessions. During the first four sessions, students are prepared to strengthen their resolve to quit tobacco use. The second four sessions are focused on quit-attempts. A more detailed description of the sessions can be found in the previous article on the implementation and immediate outcomes of the project (Espada et al., 2015).

Translation and cultural adaptation

The original version of the curriculum was provided by the Project EX team at the University of Southern California (USC). It was translated into Spanish by two translators, bilingual researchers from the University Miguel Hernández (UMH) Spain, who then checked the translation by reading both the English and Spanish versions. Before the program was implemented, the Spanish version was pilot-tested on a focus group comprising 10 youths at the same university to verify that the program material was clearly understood and culturally appropriate.

In addition to language adaptations, five major changes were made to the curriculum to adapt it to Spanish culture. The first change was related to the incentives provided in Project EX when it was implemented in the United States. In most implementations, students were provided with extrinsic motivators; for example, they were told that they would obtain elective credits for participating in the program (i.e. they did not have to stay after school). In Spain, however, as in other international settings where Project EX is being implemented (Idrisov et al., 2013; Sussman, 2012), no incentives were included for attending the program sessions. Second, the original curriculum targets "tobacco" use which includes smokeless tobacco, pipes, cigars, and chewing tobacco. So, as Spanish adolescents very rarely use any other form of tobacco than cigarettes (Meneses et al., 2013; Spanish Drugs Observatory, 2013), that information was removed and the program focused on cigarette smoking. Third, all names of characters in the talk shows (see Sussman, 2012) were changed from American to Spanish names. Fourth, the monetary amounts were changed from dollars to euros; for example, in Session 1, regarding the amount of money spent per year from smoking a pack of cigarettes a day. Finally, in Session 3 "Health Dangers of Tobacco Use," the original curriculum included a question list for a game about second-hand smoke and policies. In this case, questions and forced-choice responses were changed to reflect policies in Spain. For example, one question asks "In which of the following places is it legal to smoke in the United States? ("Airline flight," "Interstate bus," "New York City taxi cab," and "None of the above")." This item was replaced with "In which of the following places is it legal to smoke in Spain? ("Airport," "Bus station," "Taxis," and "None of the above" [correct answer])."

Participants

Participants were 211 students from the South East region of Spain, which has a population of approximately 2 million and an area of more than 5800 km^2. The sample was a representative percentage of the adolescent Spanish population in percentage for gender and age. Participants were randomly assigned to one of two experimental conditions (99 in the control condition and 112 in the program condition). Participants and their parents provided written informed assent and consent, respectively, to participate in this study. Parents were only told that their children would participate in a study on health promotion, including tobacco education. The assessment was carried out during the first meeting, in small groups (not significant (ns) = 5–10). Among the 211 subjects who participated in the pretest survey, 92 (34 in the control condition and 58 in the program condition) also completed 1-year follow-up questionnaires (43.6% retention rate).

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Adolescents in the control condition received no formalized intervention classes, materials, or programs and were surveyed at each time point. Once the program group had received the intervention and all evaluations had been completed, control group students received the program (as a wait-list control).

Participants varied in age from 15 to 20 years ($M = 17.2$; standard deviation (SD) = 1.23), at 1-year follow-up. The sample was 48.6 percent male, 93 percent Spanish, and 7 percent other nationality (North Africa, Central Europe, and South America), and 74.6 percent of the students lived with both parents.

Training in Project EX

The initial 8-hour training was conducted at USC for the Spanish research team in charge of the adaptation of Project EX, to guide the translation, cultural adaptation, and implementation. Then a second training seminar of 8 hours was scheduled for 11 graduate psychology students at the UMH. These students were given the opportunity to become program facilitators. All volunteers received an introductory lecture about Project EX, which included a brief summary of the curriculum, its history, advantages of using the program, and the role of program facilitators. Six graduate students (all females; mean age = 24 years) were interested in implementing the program. These facilitators received extra training during 2-hour meetings, each after studying and practicing the eight Project EX sessions during a 2-day workshop led by the program developer (Dr Steven Sussman) and Project EX health educator (Daniel Soto, MPH), including learning details of program delivery and how to deliver the material with fidelity.

Implementation, data collection, and measures

The clinic program was delivered in classrooms over a 5-week period after school. For the first 8 weeks, there were two clinic sessions a week, and over the subsequent 2 weeks one session a week. Paper-and-pencil pretest and follow-up questionnaires were administered at the beginning of the first session and 1 year after completion of the eight session programs. This pilot study was approved by the Ethics Committee of Miguel Hernández University, ensuring that the study respects human rights, maximizes confidentiality of the participants' responses, and does not involve risk to participants. Data were collected by the same persons who had delivered the program to specific clinic groups. Data were collected at pretest just prior to Session 1, at 6 months after the last session (Espada et al., 2015), and 1 year after completion of the program (with the same time lag in the control condition). Attempts were made to help maintain confidentiality of the responses by placing completed questionnaires into sealed envelopes, relaying to youth that only the data analyst at UMH would see their responses, and telling them that their data would be entered via a code number rather than by name.

Questionnaires took approximately 20 minutes to complete. Demographic items included age (in years), gender, nationality (born in Spain, or immigrated to Spain from another country), and current living situation (with parents, living alone, other situation). Smoking behavior (past month) was assessed by means of an open-ended question "How many times have you used cigarettes in the last month (30 days)? (0 to 100+ times)," which was the outcome measured at the 1-year follow-up. To assess intention to quit, students were assessed with the question "Do you think you will ever quit smoking cigarettes?" Response categories were as follows: "0: I never smoke cigarettes," "1: Yes, I already have," "2: Yes, I will sometime in the future," "3: Yes, I will in the next few weeks," "4: Maybe," and "5: No." Smoking expectation was assessed with the question "How likely is it that you will smoke cigarettes in the next 12 months?" Response categories were as follows: "0: Definitely not," "1: Probably not," "2: A little likely," "3: Somewhat likely," and "5: Very likely." Motivation to quit was assessed with the question "How much do you want to quit smoking now and/or stay smoke-free?" Response

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categories were as follows: "1: A lot," "2: Somewhat," "3: Slightly," and "4: Not at all." The level of nicotine dependence was assessed with the eight-item modified Fagerström Tolerance Questionnaire (mFTQ) (Idrisov et al., 2013; Prokhorov et al., 1996, 2000). Nicotine dependence was dichotomized into 0 or low (0–5) and high (6–9) levels.

Data analysis

We used chi-square to analyze attrition. Variables included school, age, gender, program condition, nationality, whether or not participant lives with both parents, last 30-day cigarette smoking, future smoking expectation, intention to quit, motivation to quit, and mFTQ (dichotomized into low and high nicotine dependence). The analysis of attrition was performed across conditions (stayers versus leavers; external invalidity) and regarding the interaction between condition and each one of the related variables (internal validity).

Data analysis for program effects was completed with multi-level mixed analysis, by using the package *nlme* (Pinheiro et al., 2014) from the *R* statistical program. In these analyses, condition was considered as a fixed variable (program group compared to control group), and school was considered as a random factor. With these specifications, we can control for the intra-class correlation (of schools nested within condition) between scores at pretest and follow-up. Variables adjusted for in the analyses included baseline measurements for the outcome variables that were examined in the specific analysis, age, gender, and propensity for attrition at 1-year follow-up. The propensity for attrition score was calculated from a model predicting the actual attrition status with pretest measures (Berger, 2005). The pretest measures in the attrition propensity prediction models included school, age, gender, study condition, nationality, whether or not living with both parents, intention to quit smoking, future smoking expectation, motivation to quit, last 30-day cigarette smoking, and mFTQ for self-reported nicotine dependence level. The outcome variables analyzed were as follows: last 30-day cigarette smoking, future smoking expectation, intention to quit, motivation to quit, and mFTQ scores. Cohen's *d* effect sizes for each variable were calculated. Finally, for the quit analysis, we used the Fisher's exact test without controlling any variable.

Results

Assessment of attrition bias at 1-year follow-up

First, the influences of demographic variables and each outcome variable were examined for attrition across conditions (external validity). Two separate analyses were performed, and at 1-year follow-up 119 participants were lost (56.39% attrition). School was found to be significantly different across attrition status ($p < .001$), and last 30-day cigarette smoking was also statistically significant ($p < .001$). Students who dropped out reported an average consumption of 205 cigarettes per month ($SD = 174$) at baseline, while participants who surveyed at 1-year follow-up reported an average consumption of 102 cigarettes per month at baseline ($SD = 75$).

Finally, the attrition analysis for comparing conditions (internal invalidity) was completed. The percentage of subjects at 1-year follow-up who dropped out of the study was similar across conditions ($\chi^2(1) = 0.1$; $p = .54$). At 1-year follow-up, the attrition analysis revealed statistically significant differences across experimental conditions. The program group exhibited 48.21 percent of attrition, whereas the control group exhibited 65.65 percent of attrition ($\chi^2(1) = 24.11$; $p < .01$). However, no significant condition interaction effects were found for demographic or outcome variables.

Program effects at 1-year follow-up

The 30-day intent-to treat smoking quit rate for each condition was calculated. In the program condition, the percentage of quitters was 7.81 percent (i.e. 10 smokers quit; Fisher's

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Table 1. One-year follow-up program effects.[a]

	Control ($n = 34$)	Program ($n = 58$)	Net effect	d
	1-year pretest	1-year pretest	1-year pretest	
	$\Delta \pm SE$	$\Delta \pm SE$	$\Delta \pm SE$	
Future smoking expectation[b]	−0.16 ± 0.12	0.46 ± 0.11**	0.74 ± 0.07*	.73
Intention to quit	−0.49 ± 0.21	0.93 ± 0.15	1.27 ± 0.06***	.82
Motivation to quit[b]	0.09 ± 0.11	0.26 ± 0.13	0.12 ± 0.02**	.34
mFTQ nicotine dependence	0.33 ± 0.14	0.59 ± 0.21*	0.26 ± 0.11*	.56
Number of cigarettes in the last 30 days (active smokers only; n control = 34, n program = 48)	−29.43 ± 112.19	−63.94 ± 113.22**	−34.61 ± 112.91***	.26

SE: standard error; mFTQ: modified Fagerström Tolerance Questionnaire.
[a]Adjusted for the specific outcome assessed at baseline, age, gender, and school for attrition center modeled as a random effect.
[b]Reversed score.
*$p < .05$, two-tailed; **$p < .01$, two-tailed; ***$p < .001$, two-tailed.

exact test: $p = .04$), and there was no adolescent who stopped smoking in the control group (Fisher's exact test: $p = .02$). Table 1 shows the variability of the dependent variables evaluated for program and control groups. Project EX demonstrated a relatively greater decrease in future smoking expectation ($d = .73$; $p = .04$), elicited greater intention to quit ($d = .82$; $p = .001$), higher motivation to quit ($d = .34$; $p = .009$), lower mFTQ scores ($d = .56$; $p < .05$), and greater influence on number of cigarettes in the last 30 days ($d = .26$; $p < .001$; pretest: control mean = 138.2, $SD = 176.86$, program mean = 193.11, $SD = 174.68$; follow-up: control mean = 109.12, $SD = 175.36$, program mean = 84.21, $SD = 101.47$).

Discussion

The high rates of teenage smoking in Spain indicate the need to develop effective long-term programs for tobacco cessation such as Project EX, which is derived from a theoretical model of smoking in adolescence. This study tested the 1-year effects of this cessation program among Spanish adolescents.

Participants who received the program reported a statistically significant greater intention to quit. Furthermore, in this study, participants in the program group reported lower scores in future smoking expectation and nicotine dependence, and higher motivation to quit smoking at 1-year follow-up. Furthermore, 18.75 percent quit smoking (no one in the control group quit), compared to the initial number of smokers at pretest. Reduction in the level of 30-day smoking at 1-year follow-up was also significant.

Compared to the results at immediate posttest and the 6-month follow-up, the long-term effects of Project EX are more promising. Participants who received the program experienced an improvement in all variables, with reduced scores in future nicotine dependence scores and increased scores in intention to quit at immediate posttest, and 6-month follow-up showed its influence on future smoking expectation. In a clustered randomized controlled trial, approximately 14 percent quit in the program group versus 0 percent in the control group (Espada et al., 2015). These results indicate that Project EX as a cessation program has the potential long-term effects for smoking cessation among adolescents in Spain.

Considering previous studies on Project EX in other countries, the results in Spain are promising. In China, 4-month follow-up data indicated a 10.5 percent 30-day quit rate and a 14.3 percent 7-day quit rate, compared to a 3 percent naturally occurring quit rate in a

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multiple baseline design (Zheng et al., 2004). Project EX in Russia (Idrisov et al., 2013) resulted in a 7 percent quit rate at the 6-month follow-up, compared to a 0 percent control group quit rate in a randomized controlled trial. Furthermore, the program significantly reduced intention to quit and future smoking intention and increased motivation to quit smoking at immediate posttest.

Still, there are several major limitations and related needs for future research. First, although our sample is not unlike that of other pilot studies (e.g. Idrisov et al., 2013; Zheng et al., 2004), future research on tobacco use cessation programming in Spain is needed with larger sample sizes and in other regions of the country. It should also include other socioeconomic and cultural variables so as to analyze possible efficacy differences between the original program and the Spanish adaptation to cultural aspects. Also, we do provide an intent-to-treat analysis for cessation, which accounts for attrition, and while we do statistically account for threats to external and internal validity statistically, we do acknowledge the limitations of our sample size. Second, the dropout rate at 1-year follow-up was 56.39 percent. We did make at least three attempts per school to collect 1-year follow-up data, suggesting that higher follow-up rates would be difficult to obtain. Student absentees accounted for most of the non-completion although subject withdrawal from the study accounted for 43 percent of the non-completion of questionnaires at follow-up. In addition, we made five attempts to telephone those students who we could not reach at the schools. Only 7 percent of the calls were answered (93% of the phone numbers were incorrect, were turned off, or were not answered). This dropout rate makes it difficult to wholly know the intervention effect. In order to control this, we have reported intent-to-treat data, assuming that dropouts were still smoking. However, the attrition rate made it difficult to generalize the results. Certainly, there was a lack of general readiness to be involved in cessation programming, indicated by the percentage of schools that agreed to be involved initially, and the groups of young smokers who dropped out before the program even started or after the first session, as well as a rather high attrition rate. Implementation was held after school times, and participants did not receive any material incentive for participating, which may have led to a general lack of readiness on the part of the students. Providing coupon-based incentives can be an effective approach to encouraging positive behavior and is commonly used as response-contingent reinforcement in school. A previous study suggested that appropriate shaping by reinforcing initial attempts to quit can also improve the efficacy of smoking cessation programs for people who are difficult to treat (Lamb et al., 2010). Furthermore, incentives may support student's motivation to quit smoking, as would reward for their efforts when they quit smoking (Cahill and Perera, 2011). Use of coupon-based incentives should be considered to reduce dropout rates in the future. The results were still meaningful, because, as we have already mentioned, we reported intent-to-treat data, assuming that dropouts were still smoking. Third, future trials may be strengthened by the use of biochemical validation of nicotine use, as done in the class version (Espada et al., 2014; Gonzálvez et al., 2015). Finally, future studies might assess the use of other tobacco products in Spain. For example, while almost all tobacco use among adolescents has been cigarette smoking, the marketing of electronic cigarettes has been very aggressive. Besides serving as a gateway to tobacco consumption by adolescents, they can promote stagnation in the process of smoking cessation process (Wills et al., 2015).

Despite the limitations of this study, Project EX is the first evidence-based approach previously evaluated in Spain for adolescent smoking cessation. The results of this study suggest that Project EX can be used as an effective tobacco use intervention for adolescents in Spain, given the maintenance and improvement of its long-term effects.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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ESTUDIO 5

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Nicotine dependence as a mediator of Project EX's effects to reduce tobacco use in scholars

María T. González[a], José P. Espada[a], Mireia Orgilés[a],

Alexandra Morales[a] & Steve Sussman[b]

[a]*Universidad Miguel Hernández* (España)

[b]*University of Southern California* (USA)

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Nicotine Dependence as a Mediator of Project EX's Effects to Reduce Tobacco Use in Scholars

María T. González[1], José P. Espada[1], Mireia Orgilés[1], Alexandra Morales[1] and Steve Sussman[2]*

[1] Department of Health Psychology, Miguel Hernández University, Elche, Spain, [2] Department of Preventive Medicine, University of Southern California, Los Angeles, CA, USA

In Spain, 44% of 14–18-year-olds have smoked, and 12.5% have smoked cigarettes in the last 30 days. Nicotine is one of the most addictive substances, and can lead to serious addiction in adulthood with adverse consequences to one's health. School plays a relevant role in health promotion and preventing risk behaviors such as tobacco consumption. Despite the fact that some school-based tobacco cessation and prevention interventions prove to be effective for their purposes, there is a lack of understanding as to why these programs succeed or fail. This longitudinal study aims to test the nicotine dependence (ND) as a mediator of Project EX's effect – a tobacco-use cessation program developed for high school youth to reduce tobacco consumption in scholars. Six high schools located in the Mediterranean coast were randomized for the participation of the program (Spanish version of Project EX) or a waiting-list group with baseline, immediate-posttest, and 12-month follow-up assessments. At baseline, 1,546 adolescents aged 14–21 years old (mean age: 15.28; $SD = 1.20$; 46% were women) were evaluated by self-administered tests on tobacco consumption and ND. A biomarker of smoke inhalation – a measurement of exhaled carbon monoxide (ECM) – was used. Participants who were smokers ($N = 501$; 32%) were selected for this study. Mediation analyses were conducted using the PROCESS v2.12 macro for Windows. The significant criterion was $p \leq 0.05$, and 5,000 samples were used for bias-corrected bootstrap confidence intervals. Results indicated that Project EX indirectly decreased the number of cigarettes smoked in the last month, the number of cigarettes smoked within the last 7 days, the number of daily cigarettes, and ECM level at 12-month follow up through decreasing the level of ND in the short-term. This is the first Spanish study that explores ND as a mediator of the long-term efficacy of Project EX to reduce tobacco consumption in adolescents. Results suggest that interventions that reduce ND at short-term are more likely to be successful to decrease tobacco use at long-term.

Keywords: nicotine dependence, Project EX, tobacco, cessation, prevention, school-based, adolescents, mediation analysis

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****Correspondence:***
José P. Espada
jpespada@umh.es

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INTRODUCTION

Tobacco consumption is the leading preventive cause of disease and early death in developed countries (World Health Organization [WHO], 2014). Teens who experiment with tobacco consumption later become regular users and progress to regular use of other more harmful substances (Botvin and Griffin, 2007). In recent years there has been a growing interest in interventions for teen smoking cessation, since this population comprises the most vulnerable group, as it is at adolescence when addiction starts (Abad and Ruiz-Juan, 2015).

In Spain, tobacco is the second most consumed addictive substance, according to the latest data from the National Drug Plan (Spanish Drugs Observatory, 2015). It is estimated that 44% of adolescents have smoked on at least one occasion, 35% have smoked in the last year, and 12.5% have smoked cigarettes in the last 30 days. Motivations that lead adolescents to smoke are diverse and include the interaction of genetic and environmental factors that favor the initiation, experimentation, and consolidation of a level of nicotine dependence (ND; Cogollo-Milanés and de La Hoz-Restrepo, 2010). Sensation seeking, low risk perception, peer acceptance, and smoking social component favor adolescents risk behaviors (Latorre et al., 2014; Cantó et al., 2015). Also, adolescents who start smoking at a young age have a higher ND (Balboa et al., 2011; Dierker et al., 2015), establishing it as the main factor maintainer of smoking behavior (Villalobos et al., 2015).

Nicotine dependence is considered a construct which brings cognitive, behavioral, and physiological symptoms that characterize compulsive consumption (Villalobos et al., 2015). Dependence level can be considered a continuous variable, scoring from 0 to 19, where scores from 0 to 2 is considered low dependence, scores 3–4 is low dependence, 5 is medium dependence, scores 6–7 is high dependence, and from 8 to 19 very high dependence (Fagerström, 1978; Prokhorov et al., 2000). In turn, these dependence levels are established as a risk factor in the onset of depressive symptoms and negative moods (Gonzálvez et al., 2015), as well as schizophrenia and alcoholism (Becoña and Míguez, 2004), so it is necessary to design interventions to prevent tobacco consumption.

Project EX (Sussman et al., 2004) is an empirically validated school-based smoking-cessation intervention for adolescents developed in the United States (California). The intervention focuses on personal skills (such as assertiveness training), coping withdrawal, and motivational factors. The Project EX clinic version shows consistently positive effects through several controlled studies in the U.S. to prevent and reduce tobacco consumption in adolescents. In order to evaluate the efficacy of the program in other cultures the program was implemented and evaluated in several other countries (Sussman, 2012). The first international pilot study completed was in Wuhan, China (Zheng et al., 2004), with an intent-to-treat 30-day quit rate of 11% at a four-month follow-up in adolescents aged 16–17 years. The second international pilot study was in Bashkortostan (Russia), with adolescents aged from 13 to 19 years. Intent-to-treat 30-day quit rate was 7.5% in the program group versus 0.1% in the control group at a six-month follow-up (Idrisov et al., 2013). In Spain, Project EX effectiveness has also shown a tobacco cessation in adolescents aged 13–19 years old, with a significantly higher 30-day intent-to-treat rate for adolescents who received the program (4.9%) compared to the control group (0%) (McCuller et al., 2006; Espada et al., 2015, 2016). Higher level of motivation to quit smoking was related to higher smoking quit rates; therefore, motivation to quit smoking is considered a mediator of the effects of the intervention.

Mediation analysis are especially useful to know how interventions work by identifying the variables that have the greatest influence on the effectiveness, and what other variables (on which the intervention has no impact) are particularly relevant to achieve the goal of the intervention, and they need to be revised to increase the effectiveness of the intervention (MacKinnon, 2008). McCuller et al. (2006) analyzed the role of motivation to quit smoking as a mediator variable of Project EX; however, more evidence is needed on what mechanisms are underlying this intervention's effects. This longitudinal study aims to test the ND as a mediator of Project EX's effectiveness to reduce tobacco consumption in adolescents from Spain.

MATERIALS AND METHODS

School Recruitment and Experimental Design

The study was approved by the institutional review board at Miguel Hernandez University, Spain. The education authorities were informed of the study goals, and authorization was requested by the parents, who were informed by letter and requested to provide written consent for their children to participate in the study. The written parental consent was provided to all minors participating.

We contacted a convenience sample of 45 schools from 17 towns in the Alicante, a province of Spain. A first meeting with the school boards was held to present the objectives of the intervention, and a total of six high schools from three cities [Elche ($n = 4$), Crevillente ($n = 1$), and San Vicente ($n = 1$)], agreed to participate. The schools recruited were randomly assigned to one of two experimental conditions: treatment or standard care (control).

A total of seventeen Spanish graduate students were interested in implementing the program. A researcher who was previously trained by the program developer provided training to all persons who finally delivered the program.

Two translators were responsible for the translation into Spanish of the original version of the Project EX program content. The final version was revised by two bilingual researchers working at the Miguel Hernandez University by comparing the English and Spanish versions. Before implementing the program, the Spanish version of Project EX was assessed in a focus group ($n = 10$ high school students). This evaluation was helpful to test the feasibility of the program content and verified that it was clearly understood and culturally appropriate. In addition to language adaptations, some changes were made in the Project EX program to adapt it to Spanish culture. The Project EX classroom program is closely adapted from the clinic program (Sussman

et al., 2001; Sun et al., 2007). The learning activities included strategies to quit smoking and learning skills for maintenance without smoking, with an interactive methodology based on motivation. The methodology of Project EX in Spain can be found somewhere else (Espada et al., 2015). The sessions and the objectives of the program are shown in **Table 1**.

Participants

A total of 1,546 scholars aged 14–21 years old (mean age: 15.28; $SD = 1.20$; 46% were women) were evaluated by self-administered tests. Adolescents who were smokers ($N = 501$; 32%) were selected for this study. **Table 2** shows descriptive information about the sample.

Data Collection and Measures

Participants were evaluated at pretest, posttest, and 12-month follow-up using paper-and-pencil questionnaire. Demographic variables included gender, age (years), nationality (born in Spain, or immigrated to Spain from another country), current living situation (with parents, live alone, other situation), and parents' education (mean response across father's (or stepfather's) and mother's (or stepmother's) educational levels based on categories derived from Hollingshead and Redlich (1958).

Smoking behavior was assessed with the fill-in-the blank items asking "How many cigarettes have you smoked in the last month (30 days)?" and "How many cigarettes have you smoked in the last week (7 days)?", and the assessment-day smoking behavior was measured with the item: "Did you smoke tobacco today?" The 8-item modified Fagerstrom Tolerance Questionnaire (mFTQ) was used to measure the level of ND (Prokhorov et al., 1996, 2000; Idrisov et al., 2013). An example of the item is: "How soon after waking do you smoke your first cigarette?" The higher sum score indicates the higher the participant's level of ND. Cronbach alpha for mFTQ in this sample was appropriate ($\alpha = 0.87$). Expired CO was assessed using a breath CO monitor (Micro+ Smokerlyzer; Bedfont Technical Instruments, Kent, UK[1], accessed April 19, 2014) at pretest, posttest and follow-up evaluations. This measure was valuable to validate self-reported assessment-day smoking.

Data Analysis

Descriptive statistics were computed for sociodemographic variables and main outcomes of the present study. Baseline differences between the control and experimental groups were calculated using T-test (quantitative variables) and Chi-square (χ^2) (qualitative variables). Statistical analyses were carried out using SPSS Statistics v23.0.

Mediation analyses were implemented with the SPSS PROCESS macro (Hayes, 2013). We used 5,000 samples for bias-corrected bootstrap confidence intervals; and the significant criterion was $p \leq 0.05$. The single-mediator model described by Hayes (2013) was used (**Figure 1**). The predictor was a binary variable contrasting a tobacco-use cessation program (Project EX) with the control group (non-intervention). Primary outcomes were continuous variables: three self-reported measures - number of cigarettes smoked in the last month, number of cigarettes smoked within the last 7 days, and number of daily cigarettes -, and a biological measure (exhaled CO level). Analyses were controlled for sex, age, school, and baseline measures.

We assigned the mediator as changes in the level of ND. Indirect effect is estimated in simple mediation models as a product of regression weight linking X–Y through M (Ind 1) (Hayes, 2013). Mediation analyses were conducted for the four primary outcomes using a product-of-coefficient approach (Preacher and Hayes, 2008). The effect of the intervention on the level of ND (M) is represented in the path α; while the effect of the level of ND (M) on each primary outcome (Y) is represented in the path β. If indirect effects do not include zero, there is a significant mediation.

RESULTS

Table 3 shows descriptive statistics of the main outcomes and the mediator in each evaluation: baseline, posttest, and 12-month follow-up for the intervention and control groups. The program

[1]http://www.bedfont.com/ch/smokerlyzer/micro

TABLE 1 | Project EX sessions and objectives.

Session name	Contents
Orientation	Imparts the ground rules for the group and discusses reasons for quitting tobacco.
Tobacco affects your life	Discusses how tobacco use can cause, rather than relieve stress.
Health dangers of tobacco use	Discusses the harmful substances in tobacco and how it can injure one's body.
Quitting step 1-Making a commitment about not using tobacco	Discusses addiction to tobacco. Methods of quitting smoking, and physical and psychological aspects of withdrawal are discussed.
Quitting step 2-Managing withdrawal symptoms	Discusses more about nicotine, addiction, and strategies of avoiding addiction or managing withdrawal symptoms. Psychological coping includes self-forgiveness and avoiding false expectations regarding how quitting will and will not affect one's life.
Taking care of a healthy body	Involves learning lifestyle balance strategies, including weight control and practicing a "yoga activity."
Taking care of your piece of mind	Involves learning more coping strategies, including assertiveness training and anger management. Participants also learn the "letting feelings pass" meditation activity.
Not smoking again: commitment and avoiding relapse	Involves learning means to avoid using tobacco, and mentions how topics covered could be applicable to other substances.

TABLE 2 | Baseline characteristics and reports of tobacco consumption measures at 12-month follow-up of participating Spanish adolescents by experimental condition.

Characteristics	Intervention group	Control group	Total	Test statistics[a]
Sample size (*N*)	240	261	501	
No. (%) male	114/240 (47.5)	132/261 (50.6)	246/501 (49.1)	0.473
Mean age (years) (*SD*)	15.66 (1.12)	15.98 (1.44)	15.83 (1.30)	−2.703**
Nationality				
Spanish	214/240 (89.2)	235/261 (90)	449/501 (89.6)	0.102
Other	26/240 (10.8)	26/261 (10)	52/501 (10.4)	
Live with. . . (%)				
Both parents	163/216 (75.5)	208/251 (82.9)	371/467 (79.4)	5.553
Mother	47/216 (21.8)	34/251 (13.5)	81/467 (17.3)	
Father	6/216 (2.8)	9/251 (3.6)	15/467 (15)	
School achievement (number of failed courses/per year)	3.37 (3.82)	2.88 (3.36)	3.11 (3.59)	1.476
Age of first cigarette smoked	13.19 (2.03)	13.47 (1.75)	13.34 (1.89)	−1.698
Number of daily cigarettes	1.88 (3.70)	2.43 (4.37)	2.15 (4.05)	−1.443
Number of cigarettes smoked within the last 7 days	8.45 (18.31)	13.85 (31.67)	11.18 (26.03)	−2.228*
Number of cigarettes smoked in the last month	2.26 (4.65)	3.06 (5.21)	2.66 (4.95)	−1.721
Exhaled carbon monoxide (ECM) (CO) level	2.58 (2.80)	2.56 (3.06)	2.57 (2.93)	0.054
Nicotine dependence (ND)	29.32 (8.58)	28.82 (8.45)	29.06 (8.51)	0.645

*$p \leq 0.05$; **$p \leq 0.01$; SD, standard deviation; [a]T-test was used for significance testing of continuous variables, and χ^2 test was used for significance testing of categorical variables; Higher scores represent higher level of ND.*

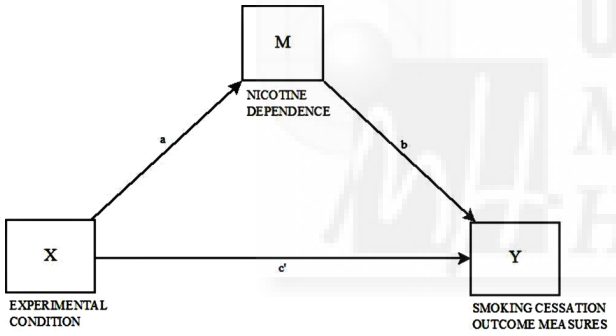

FIGURE 1 | Path diagram of the effect of the intervention on smoking cessation outcome measures at 12-month follow-up (Time 3) via nicotine dependence (ND) (Time 2), after controlling for baseline differences, gender, age, and school. X, Independent variable; Y, Dependent variable; M, Mediator; a, b, c′, Regression coefficients. The 95% CIs for indirect effects were obtained by bootstrapping with 5,000 resamples.

had a significant impact on the level of ND (M) (path α) as shown in **Table 4**. This finding shows that adolescents involved in the intervention group informed lesser level of ND at posttest than those in the control group.

Path β shows the existing significant relationship between the level of ND and all the main outcomes: number of cigarettes smoked in the last month ($p = 0.04$), number of cigarettes smoked within the last 7 days ($p = 0.01$); number of daily cigarettes ($p = 0.01$), and exhaled carbon monoxide (ECM) (CO) level ($p = 0.009$). In all the analyzed models, path β shows that the higher level of ND (posttest) was related to higher number of cigarettes smoked in the last month, higher number of cigarettes smoked within the last 7 days, higher number of daily cigarettes, and higher level of ECM (CO) level at 12-month follow-up.

The intervention positively reduced the number of cigarettes smoked in the last month (ACI = −22.44, −1.14), number of cigarettes smoked within the last 7 days (ACI = −14.09, −1.65); number of daily cigarettes (ACI = −2.07, −0.25), and ECM (CO) level (ACI = −1.29, −0.14) after 12-month period indirectly through reducing the level of ND.

DISCUSSION

This work's objective was to test the ND as mediator of Project EX's effect to reduce tobacco consumption in adolescents from Spain. Findings show that the intervention had a significant impact on the level of ND short-time, and this variable was a mediator of the intervention's effect on several tobacco use measures. Compared to the control group, adolescents who received Project EX reduced their level of ND short-term, and they were more likely to report lesser tobacco use at 12-month follow-up, in terms of number of cigarettes smoked in the last month, number of cigarettes smoked within the last 7 days, number of daily cigarettes, and ECM level. In the present study, there was a significant relationship between the level of ND and all these main outcomes. The results are consistent with other studies that suggest that lower ND corresponds to lower tobacco consumption (González et al., 2016; Ruiz and Miranda, 2016).

Previously, McCuller et al. (2006) evaluated the effects of Project EX on changing motivation to quit smoking. It concludes that motivation to quit smoking is a plausible mediator of cessation program effects since higher level of motivation was statistically significantly related to higher smoking quit rates. In

TABLE 3 | Self-report of tobacco consumption measures, and ND (as mediator) by condition and assessment period.

	Baseline		Posttest		12-month Follow-up	
	Intervention (*N* = 240)	Control (*N* = 261)	Intervention (*N* = 149)	Control (*N* = 196)	Intervention (*N* = 139)	Control (*N* = 113)
Potential mediator mean (±) SD						
mFTQ ND[a]	26.15 (4.59)	25.75 (4.78)	25.56 (5.45)	26.42 (5.02)	26.48 (5.30)	28.44 (3.58)
Outcomes mean (±) SD						
Number of cigarettes smoked in the last month	2.26 (4.65)	3.06 (5.21)	1.50 (2.95)	2.57 (3.79)	1.98 (3.67)	2.83 (4.22)
Number of cigarettes smoked within the last 7 days	8.45 (18.31)	13.85 (31.67)	5.22 (13.57)	14.10 (56.14)	7.34 (18.29)	15.91 (31.90)
Number of daily cigarettes	1.88 (3.70)	2.43 (4.37)	1.42 (3.86)	2.93 (9.82)	1.14 (2.68)	2.47 (4.76)
Exhaled carbon monoxide (CO) level	2.58 (2.80)	2.56 (3.06)	1.97 (2.22)	2.56 (2.91)	1.58 (1.27)	2.14 (2.10)

SD, standard deviation. [a]*Modified Fagerstrom Tolerance Questionnaire score.*

TABLE 4 | Nicotine dependence as a mediator of the effect of Project EX, compared with a control group, on tobacco use measures by the 12-month follow-up among adolescents from Spain.

Main outcome (*Y*)	Effect of the intervention (*X*) on the ND (*M*)[a]			Effect of ND as a mediator (M) on the main outcome (*Y*)[b]			Indirect effect of ND as the mediator on the main outcome (*Y*)
	α Path (SE)	95% CI	*p*-value	β Path (SE)	95% CI	*p*-value	Ind 1[c] [ACI][d]
Model 1	–2.43 (1.20)	–4.83, –0.04	0.046	3.59 (1.27)	1.06,6.13	0.0059	–8.78 [–22.44, –1.45]
Model 2	–2.93 (1.20)	–5.32, –0.54	0.016	2.07 (0.71)	0.65,3.50	0.0048	–6.09 [–14.09, –1.65]
Model 3	–2.93 (1.18)	–5.28, –0.58	0.015	0.30 (0.11)	0.08,0.52	0.0076	–0.89 [–2.07, –0.25]
Model 4	–3.69 (1.37)	–6.44, –0.94	0.009	0.14 (0.05)	0.02,0.26	0.0163	–0.53 [–1.29, –0.15]

[a]*The α path is the Project EX's effect on each potential mediator.* [b]*The β path is the effect of mFTQ ND mediator on the main outcome (Y).* [c]*Ind 1 = X – M1 – Y.* [d]*Asymmetric confidence interval based on bootstrap method with 5,000 replicates. The mediation analyses were adjusted for baseline differences between Project EX and the control group, gender, age, baseline value of the mediator and school. Model 1: Main outcome (Y) = Number of cigarettes smoked in the last month. Model 2: Main outcome (Y) = Number of cigarettes smoked within the last 7 days. Model 3: Main outcome (Y) = Number of daily cigarettes. Model 4: Main outcome (Y) = Exhaled carbon monoxide (CO) level.*

the present study, composed of Spanish adolescents, motivation was discarded as a mediator of the intervention's effects to reduce tobacco consumption because of the characteristics of the sample. At one-year follow-up of the smoking intervention program with Spanish adolescents there was a lack of general readiness to be involved in cessation programming. Evidence of this were the low percentage of schools that agreed to be involved initially, and the groups of young smokers that dropped out before the program started or after the first session (39.3%), as well as a high attrition rate. This results may be explained by the fact of the implementation was held after school, and students did not receive any incentive for participating in the present study (Espada et al., 2016). This suggests that participants were not highly motivated to participate in the program.

In Spain, Project EX is the only school-based tobacco cessation program whose effects have been proven to be positive to reduce tobacco consumption at 6 and 12 months (Espada et al., 2015, 2016). Furthermore, the assessment of expired CO by use of a breath CO monitor validates self-reported smoking responses. It is noteworthy that results were similar when the main outcome was assessed with self-report measures than when biological measures were used. Although ND was a mediator of the intervention's effects on every main outcome, it is curious that the coefficient of mediation was higher in the model with cigarette consumption in the last month as a main outcome compared to the rest of measures. The coefficient of mediation decreased gradually as the main outcome implied a more limited time or more recent use of tobacco (last 7 days, daily). This effect may be explained by memory effect of the participants; in other words, it may be more easily remembered the number of daily cigarettes than the number of cigarettes smoked in the last month. Furthermore, it is important to note that the measurement of CO is a biological measure, and therefore, it is more accurate.

The results of this study have important implications for the tobacco cessation in Spanish adolescents. The results permit identifying the mechanisms involved in the effectiveness of a tobacco cessation program 12 months subsequent to its application. The present study has at least four strengths. This is the first Spanish study that explores ND as a mediator of the long-term efficacy of Project EX to reduce tobacco consumption in adolescents. A considerable sample size was used to explore this issue. The longitudinal design (including 12-month follow-up) is an important strength of the present study since there is a lack of this type of studies in prevention science. A biological measure was used, rather than only self-reported measures, which provides a more direct indicator of tobacco consumption in this population.

Nevertheless, the present study has some limitations. First, although the study involved a large sample, it is not from a varied geographical origin, so it is necessary to expand this study to other regions of the country. Second, U.S. and international survey data reveal that youth are aware of e-cigarettes and use of these products in this population is rapidly increasing (Durmowicz, 2014), and currently unregulated (Dutra and Glantz, 2014). In this study conventional tobacco consumption is evaluated, so it could be that adolescent consumers of e-cigarettes do not identify as tobacco consumers. Future studies on the consumption of tobacco should consider the use of this popular type of electronic nicotine delivery system.

Despite the limitations, this is the first Spanish study that explores ND as a mediator of the long-term efficacy of Project EX to reduce tobacco consumption in adolescents. However, more research is required for a better understanding of the success and/or failure of smoking cessation and prevention programs in adolescent population.

AUTHOR CONTRIBUTIONS

All individuals listed as authors have: Contributed substantially to the conception and design of the work. Drafted the work or revised it critically for important intellectual content. Have given final approval of the version to be published. Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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One-year effects of Project EX in Spain: A classroom-based smoking prevention and cessation intervention program

María T. González[a], José P. Espada[a], Mireia Orgilés[a]

Daniel Soto[a] & Steve Sussman[b]

[a]*Universidad Miguel Hernández* (Spain)

[b]*University of Southern California* (USA)

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RESEARCH ARTICLE

One-Year Effects of Project EX in Spain: A Classroom-Based Smoking Prevention and Cessation Intervention Program

María T. Gonzálvez[1]*, José P. Espada[1], Mireia Orgilés[1], Daniel Soto[2], Steve Sussman[2]

1 Department of Health Psychology, Miguel Hernandez University, Elche, Spain, **2** University of Southern California, Los Angeles, California, United States of America

* mgonzalvez@umh.es

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Abstract

Background

Tobacco use prevalence rates are high among Spanish adolescents. Programming to counteract tobacco use is needed.

Methods and Findings

The current study provides a one-year follow-up outcome evaluation of Project EX, an eight-session classroom-based curriculum. The intervention was tested using a randomized controlled trial with 1,546 Spanish students, involving three program and three control schools. Compared to the control condition, the program condition revealed a greater reduction in nicotine dependence ($p < .05$) and CO ppm levels ($p < .001$), and lower consumption of cigarettes at last month ($p = .03$).

Conclusions

Long-term outcomes of the Project EX classroom-based program are promising for adolescent prevention and possibly cessation in Spain.

Introduction

Tobacco use has become a pediatric epidemic in Spain, because most new smokers begin at school age [1], and most regular adolescent tobacco users continue to use tobacco into adulthood [2]. The latest survey from the European School Survey Project on Alcohol and Other Drugs found that 54% of young Europeans aged 15 years had smoked cigarettes at least once in their lifetime, and more than half of the lifetime smokers had smoked cigarettes in the last 30 days (approximately 30% of all youth) [3]. These data may be contrasted with that of the United States, where approximately 7% of high school students indicated some form of tobacco use at least once in the previous month [4]. In Spain, tobacco and alcohol are the most consumed

drugs in adolescence, and prevention and control of tobacco use is one of Spain's most pressing public health needs [5, 6]. Tobacco education may be most fruitful when provided before adulthood, in order to prevent initiation, avoid cumulative physical consequences, and financial and societal costs [2]. Relatively few studies of teen smoking cessation have been conducted worldwide compared to adult cessation programs, with 25% of these studies being conducted outside the United States [7]. Also, while some tobacco use related prevention programming has been evaluated in Spain [8], only Project EX has been well-evaluated on the potential for prevention and cessation effects among adolescents in Spain [9], and provides motivation-coping skills-commitment material [10]. However, only its immediate effects are known.

In its clinic version, Project EX has shown positive 3-to-6-month outcome effects over three experimental trials and one multiple baseline single group trial [11–14]. While the school-based clinic version of Project EX has been found to be effective in the U.S., China, and Russia, international translation research on Project EX thus far has been limited to those smokers who attend the clinic. The classroom version of Project EX sought to increase program reach and is delivered in the classroom setting, with both tobacco users and nonusers. A prevention/cessation classroom-based version of EX was delivered in southern California and showed effects across the full range of smoking, and most strongly on cessation [15].

This paper focuses on the one-year self-reported behavioral outcomes of Project EX prevention/cessation program with Spanish adolescents. A previous paper reported on the implementation and immediate outcomes of the project [9]. The program was well-received and produced immediate effects on reducing smoking intentions and CO ppm levels. We hypothesized that the classroom-based curriculum would show maintenance of effects among the full sample at one-year follow-up, which would bolster the practical importance of program effects in Spain, as variations in sustained use or cessation are observed at the follow-up [16].

Materials and Methods

School Selection and Experimental Design

Before proceeding with the recruitment of the sample, the study was approved by the IRB at Miguel Hernandez University. The education authorities were informed of the study goals, and authorization was requested. Once such authorization had been obtained, the researchers interviewed the head teachers and the school counselors, informing them verbally and in writing about the aim of the study, so as to obtain their permission and encourage their cooperation. Finally, parents were informed by letter and requested to provide written consent for their children to participate in the study. The written parental consent was provided for all minors participating.

We used a convenience sample of 45 schools from 17 towns in the Province of Alicante. After the first in-person meeting with the school board of each school to present the objectives of the intervention, a total of six high schools from three cities (Elche [n = 4], Crevillente [n = 1] and San Vicente [n = 1]), were recruited (recruitment rate = 13%). The reasons for non-recruitment were no response (72%), responded back to us after a first meeting with a statement of no interest (18%) and inability to be able to implement the study during the school day (10%). The schools recruited were randomly assigned to one of two experimental conditions: treatment or standard care (control); that is, there were three schools per condition (schools were carefully matched into pairs prior to assignment).

Project EX Curriculum

The original version of the EX prevention/cessation curriculum was translated into Spanish by two translators. Two bilingual researchers working at the University Miguel Hernandez

Table 1. Project EX curriculum.

Session name	Contents
Orientation	Imparts the ground rules for the class and discusses reasons for using, not using, quitting tobacco, or remaining tobacco free
Tobacco affects your life	Discusses how tobacco use can cause, rather than relieve stress
Health dangers of tobacco use	Discusses the harmful substances in tobacco and how it can injure one's body
Quitting step 1-Making a commitment about not using tobacco	Discusses addiction to tobacco. Methods of quitting and physical and psychological aspects of withdrawal are discussed
Quitting step 2-Managing withdrawal symptoms	Discusses more about nicotine, addiction, and strategies of avoiding addiction or managing withdrawal symptoms. Psychological coping includes self-forgiveness and avoiding false expectations regarding how not using tobacco or quitting will and will not affect one's life
Taking care of a healthy body	Involves learning lifestyle balance strategies, including weight control and practicing a "yoga activity"
Taking care of your piece of mind	Involves learning more coping strategies, including assertiveness training and anger management. Participants also learn the "letting feelings pass" meditation activity
Not smoking again: commitment and avoiding relapse	Involves learning means to avoid using tobacco again, or staying tobacco free, and mentions how topics covered in the tobacco education program could be applicable to other substances

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(UMH) checked the translation by reading both the English and Spanish versions. The feasibility of the Spanish version was assessed in one focus group, composed of 10 students at a high school before program implementation, which verified that the curriculum was clearly understood and culturally appropriate.

The Project EX classroom curriculum is closely adapted from the clinic program [17, 18]. The learning activities included strategies to not start or quit smoking and learning skills for cessation maintenance, with a motivation-enhancement, interactive protocol. The program is comprised of several novel activities including: 1) role playing ("talk shows"), where student volunteers fill the role of each guest and the audience (other students in class) direct questions to the guests; 2) alternative medicine strategies including healthy breathing, characterized by slow and deep breaths, and yoga and meditation activities, which involves focusing attention on the present moment; and 3) a game, "is smoking on the menu" which divides the participants into teams to answer questions about tobacco. The curriculum involves eight sessions delivered in classrooms over a six-week period. The first four sessions are conducted over in a two-week period. The second four sessions are held once per week over the course of the following month. The sessions and their objectives are shown in Table 1. A more detailed description of the sessions can be found in the previous paper on the implementation and immediate outcomes of the project [9].

Cultural Adaptations

In addition to language adaptations, five changes were made in the curriculum to adapt it to Spanish culture. First, the original curriculum targets "tobacco" use including smokeless tobacco, pipes, cigars, and chewing tobacco. Spanish adolescents very rarely use other forms of tobacco other than cigarettes [5, 6], so that information was removed and the program focuses on prevention or cessation of cigarette smoking only. Second, when Project EX was implemented as a research project in the United States, extrinsic motivators were provided as incentives.

Participants were told that they would obtain credits for participating in the program. In Spain, as in other international settings within which Project EX is being translated [11, 7], there were no incentives for attendance at the program sessions. Third, all names of characters in the talk shows [18] were changed from American to Spanish names. Fourth, the monetary amounts were changed from dollars to euros. For instance, in Session 1, "Orientation," the original curriculum provides as a suggestion for the question "What are some reasons for quitting?" that one may "Save money. Over US $2,008 per year is spent on smoking one pack per day." The amount was changed to 1,249 euros, the cost in Spain. Finally, in Session 3, "Health Dangers of Tobacco Use," there is a question list for a game in the original curriculum regarding second-hand smoke and policies. Questions and forced-choice responses were changed to reflect policies in Spain. For example, one question asks "In which of the following places is it legal to smoke in the United States? ('Airline flight,' 'Interstate bus,' 'New York City taxi cab,' and 'None of the above'.)" This item was replaced with "In which of the following places is it legal to smoke in Spain? ('Airport,' 'Bus station,' 'Taxis,' and 'None of the above' [correct answer])."

Training in Project EX

Between October and November of 2012, psychology graduate students at Miguel Hernandez University were given the opportunity to become a program facilitator. All volunteers received an introductory lecture about Project EX, which included a brief summary of the Project EX curriculum, its history, advantages of using the program, and the role of program facilitators. Seventeen Spanish graduate students (16 female), an average of 23 years of age (SD = 0.8), interested in implementing the program, spent eight hours studying and practicing the eight sessions of Project EX, including learning details of program delivery and how to deliver the material with fidelity. The training was provided by a researcher who had previously been trained by the program developer. All persons trained delivered the program to an average of two classrooms each.

Participants

An average of 12 classes was selected per school, with a range of 8 to 19 classes, across the six high schools. A total of 1,546 students were selected for participation in the study (716 in the control condition and 830 in the program condition), 57% of the total enrollment across these classes (n = 2,691). Among the 1,546 subjects that participated in the pretest survey, 965 (393 in the control condition and 572 in the program condition) also completed one-year follow-up questionnaires (62.4% retention rate). All adolescents who conducted assessments at baseline and 12 months follow-up were included in the analysis.

Participants varied from 14 to 20 years of age (M = 15.03; SD = 1.01). The sample was 50.7% male; 91.8% were Spanish and 8.2% were other nationality (e.g., South America, Morocco, Eastern Europe). Further, 80.9% of the students lived with both parents and 36.1% of youths' fathers and 36.6% of youths' mothers completed high school. Approximately 32% of the participants smoked a cigarette sometime in their lives, 13.4% smoked in the last 30 days, and 7.9% smoked on the day of the pretest assessment.

Data Collection and Measures

Pretest and one-year follow-up measures were collected from students using a self-report, closed-ended and fill-in-the-blank response questionnaire administered over one class period. At the one-year follow-up, students who failed to return the absentee survey were contacted by telephone for survey administration. Demographic items included age (in years), gender, nationality (born in Spain, or immigrated to Spain from another country), current living

situation (with parents, live alone, other situation), and parents' education (mean response across father's [or stepfather's] and mother's [or stepmother's] educational levels) [19].

Smoking behavior was assessed with the fill-in-the blank item asking "How many cigarettes have you smoked in the last month (30 days)?" The level of nicotine dependence was assessed with the 8-item modified Fagerstrom Tolerance Questionnaire (mFTQ) [11, 20, 21]. The total score is the sum of scores for the items ranging from 0 to 25. To assess smoking intention [22], students were assessed with the question "How likely is it that you will smoke cigarettes in the next 12 months?" with response categories in a Likert scale format (1: Definitely not, 2: Probably not, 3: A little likely, 4: Somewhat likely, and 5: Very likely). Furthermore, to validate assessment-day smoking responses, assessment of expired CO was completed at pretest and one-year follow-up by use of a breath CO monitor (Micro+ Smokerlyzer; Belfont Technical Instruments, Kent, UK; http://www.bedfont.com/ch/smokerlyzer/micro, accessed 4-19-2014). Participants who responded to our one-year follow-up survey (15.75% of the total sample at one-year follow-up) did not complete the CO readings.

Data Analysis

To assess the potential sampling bias due to attrition at the one-year follow-up across conditions (external invalidity), we calculated a new variable called "attrition group" in which we included 965 participants that were surveyed at both time points and compared them with the 581 participants that were only surveyed at pretest. We used logistic regression analysis with "attrition group" as the dependent variable. Predictors included age, gender, nationality (born in Spain, or not), current living situation, parents' education, assessment-last month smoking, level of nicotine dependence, and smoking intention. To assess the potential sampling bias due to attrition at the one-year follow-up as a function of condition (internal invalidity), comparisons were made between the sample that was lost at one-year follow-up and the rest of the sample that remained in the study at one-year follow-up, as a function of condition. The comparisons utilized were chi-square or t-test models to indicate statistically significant differences (two-tailed *p* value at the .05 level). Again, all relevant demographic and outcome variables were examined.

Data analysis for four outcomes variables, which compared the two conditions, was completed with multi-level analysis [23] by using IBM SPSS Statistics 21 [24]. The outcome variables evaluated in this analysis were smoking intention, last month smoking behavior, and nicotine dependence (using mFTQ score). We also examined CO readings. Condition was considered a fixed effect variable; fixed at desired experimental levels (school, considered as a random effect variable). The variables adjusted for in the analyses included baseline measurements for each respective outcome variable: age, gender, status of living with both parents, and attrition propensity. The propensity for attrition score was calculated from a model predicting the actual attrition status with pretest measures [25]. The pretest measures in the attrition propensity prediction models included age, gender, ethnicity, whether or not participant lived with both parents, program condition, and last month cigarette use. Two-tailed significance tests were employed for the significance level calculation in all analyses. In an additional analysis, intent-to-treat (ITT) quit rates were calculated for those who said that they had smoked in the last 30-days on assessment day at baseline.

Results

Assessment of Attrition Bias at Follow-up

First, regarding the analysis of external invalidity, differences were only found on age, gender, and school (see Table 2). Retained youth were slightly younger and a greater percentage female. The attrition analysis comparing conditions (internal invalidity) revealed statistically

Table 2. Comparisons of key variables between lost-to-follow-up sample and subjects retained at one-year follow-up.

		Lost		Retained		*p*	*β*	*OR*
		Mean	SE	Mean	SE			
Age (years)		15.69	1.34	15.03	1.02	<.0001	0.36	1.44
Gender (% male)		58.60	2.30	50.60	1.80	.004	0.36	1.44
Nationality (% Spanish)		88.70	0.70	91.90	0.60	.90	-0.09	0.90
Live with. . . (%)	Both parents	39.00	2.40	61.00	1.90	.11	-0.29	0.74
	Mother	47.00	1.23	24.00	0.87	.80	-0.16	0.68
	Father	14.00	2.60	15.00	1.65	.80	-0.25	0.72
Parents education		27.00	2.20	48.50	3.15	.16	0.49	1.64
School	Cayetano Sempere	7.00	1.10	8.50	0.90	.01	0.65	1.92
	Sixto Marco	20.30	2.10	25.00	1.70	.72	0.064	1.06
	Tirant lo Blanc	19.10	2.60	24.90	2.10	.56	1.21	1.36
	San Vicente	17.40	10.10	3.30	8.10	<.0001	2.71	1.50
	Canónigo Manchón	29.70	4.00	20.40	3.20	<.0001	0.87	1.39
	La Asunción	6.50	6.60	17.90	5.30	.34	1.65	1.59
Cigarette smoking	30 day	0.83	3.02	0.75	2.46	.06	-0.70	0.93
	Smoking intention	24.00	1.90	76.00	1.10	.26	0.09	1.10
	FTQ Nicotine Dependence	24.50	1.10	75.50	0.60	.09	0.20	1.22

Note: The simple effects were analyzed with t-test or chi-square for each variable

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significant differences in nationality, smoking intention, and nicotine dependence between those who were retained at follow-up. The participants that were followed-up at one-year follow-up were in a higher percentage of Spanish nationality in the control condition compared to the program condition (93.9% versus 90.6%, respectively; ($\chi 2(1) = 14.55$; $p < .05$). In addition, those followed-up in the program condition were more likely to intend to not smoke in the future than in the control condition (61.1% versus 38.9%; $t(1,539) = 6.87$; $p < .05$), and had less nicotine dependence than in the control condition (58.5% versus 41.5%; $t(1,391) = 23.67$; $p = .001$). Differences in these variables have been controlled for in the analysis.

Effects on Smoking Intention and Tobacco Use

As shown in Table 3, the program was found to be statistically significant in reducing nicotine dependence and number of cigarettes at last month. Subjects in the control condition reported a higher level of nicotine dependence at the one-year follow-up ($p < .05$) and increased consumption of cigarettes ($p = .03$). Further, at one-year follow-up, the CO monitor repeated assessments revealed a significant decrease of ppm levels in the program group (-0.56, $p < .001$) while the control group showed a significant increase of ppm levels (0.17, $p < .001$). However, one-year follow-up effects on smoking intention did not show a significant difference between the program and control condition ($p = .30$).

The intent-to treat quit rate comparison was in the right direction, but this comparison failed to approach significance ($p = .32$). Intent-to-treat quit rates were 22.2% for program condition (22 quit and 78 assumed not to quit) and 15.2% for control condition (17 quit and 95 assumed not to quit).

Discussion

The high rates of teenage smoking in Spain indicate the need to develop effective programs for tobacco prevention and cessation. The Project EX classroom curriculum was designed to

Table 3. Program Effects Adjusted for Imbalance in Attrition [a].

Outcome variables	Program (*n* = 572)			Control (*n* = 393)			Net Effect (Change in Experiment—Change in Control)			
							Net	95% CI		*p* (df = 5)
	Average	*SE*	*p*	Average	*SE*	*p*		Lower	Upper	*p* Value
Smoking intention [b]	1.60	0.08	.45	1.98	0.27	<.001**	-0.38	-1.36	-0.12	.30
Smoking last month [c]	0.57	0.18	.97	1.43	0.66	.35	-0.86	-0.19	0.31	.03*
mFTQ Nicotine Dependence [de]	0.59	0.07	<.001**	0.23	0.24	.53	0.36	-0.34	1.12	.04*

Notes:

[a] Adjusted for the specific outcome assessed at baseline, age, gender, and propensity for attrition center is modeled as a random effect.

[b] 5-Point scale from Definitely not (1) to Very likely (5).

[c] Number of cigarettes smoked in the last 30 days.

[d] 5-Point scale from Yes, I already have (1) to No (5).

[e] Modified Fagerstrom Tolerance Questionnaire score.

* $p < .05$, two-tailed

** $p < .001$, two-tailed

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produce smoking prevention and cessation effects in the same program. This study tested the one-year effects of the prevention/cessation program among Spanish adolescents.

The Project EX tobacco use cessation program in Russia [11] significantly reduced future smoking expectation, decreased intention to quit smoking, and increased motivation to quit smoking at immediate posttest. The program also resulted in a 7% quit rate at the 6-month follow-up, compared to 0% in the control condition. With the same program in China, four-month follow-up data indicated a 10.5% 30-day quit rate and a 14.3% 7-day quit rate [14], compared to a naturally occurring quit rate of 3%. In the classroom context, Project EX in southern California [17] produced a greater reduction in weekly smoking and intention for smoking in the next 12 months. At 6-and-12 month follow-ups students in the treatment condition experienced a greater reduction in weekly smoking and monthly smoking [2]. In addition, an incremental 8% higher cessation rate was observed at the program schools [15]. Immediate outcomes of Project EX in Spain [9] showed a greater reduction in smoking intention and CO ppm levels. In the present study, the Project EX prevention/cessation program was translated to Spanish and adapted slightly for the Spanish culture. At one-year follow-up, effects on nicotine dependence and last 30-day cigarette smoking show significant differences between program and control condition, in addition to a significant decrease of ppm levels in the program group along with an increase in ppm levels in the control group. These results confirm the hypothesis from the previous study [9]. We expected to find longer-term effects of the program on smoking prevalence. Although smoking intention and cessation effects did not show significant differences between treatment and control groups, we did find an effect across the range of smoking indicating a significant preventive effect.

Project EX as a prevention-cessation program can effect long-term changes. Still, there are several notable limitations. First, recruitment was not easy in Spanish high schools. Readiness to quit smoking is relatively low in Spain, especially among adolescents; changes in the larger social climate may be needed prior to disseminating school-based prevention/cessation programming [15]. Furthermore, there is low motivation among staff to add extra-curricular activities in the schedule. The recruitment rate of schools was 13%. Possibly, we could have been more aggressive in our recruitment strategies. We were not able to offer the school any incentives for participation (e.g., monetary donation to the school). Second, the dropout rate at one-

year follow-up questionnaires was 37.6%. However, we did make at least three attempts per school to collect follow-up data, suggesting to us that higher retention rates would be difficult to obtain. Student absentees accounted for most of the non-completion though subject withdrawal from the study accounted for 35% of the non-completion of questionnaires at follow-up. Furthermore, students who failed to return the absentee surveys were contacted by telephone for survey administration; only 41% of persons called were reached and surveyed. The reasons for non-telephone recruitment were no response (52%), the phone number was missing or not operational (36%), and the youth responded with a statement of no interest (12%). It should be mentioned that follow-up was about the same as previous studies [2], with a retention rate at one-year follow-up of 63% in the control group and 66.4% in the control group.

Third, subjects who completed the survey by telephone did not complete the CO readings. However, concordance of results between those who completed the survey and CO measure suggests that youth reported honestly. Finally, Project EX generalization to other Spanish locations has not yet been tested. It would be interesting to replicate this classroom modality in other Spanish cities.

Despite the limitations of this study, the use of a randomized design (albeit only three units per condition) and the large sample size, along with changes observed particularly on level of 30-day smoking and CO levels, suggests promise of Project EX as a cessation/prevention program for Spanish adolescents. Furthermore, there are no well- evaluated cessation intervention programs for adolescent tobacco in Spain, so the results of this study provide evidence about the long-term effectiveness. It is possible that cessation programming should focus on smokers in a school-based clinic setting rather than in the classroom [26].

Author Contributions

Conceived and designed the experiments: MTG JPE SS. Analyzed the data: MO DS. Contributed reagents/materials/analysis tools: MTG JPE MO. Wrote the paper: MTG JPE MO DS SS.

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CONCLUSIONES

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El *primer objetivo* de esta tesis consistió en evaluar los efectos de los programas de prevención del abuso de drogas españoles y examinar las condiciones que influyen en su eficacia. Para este propósito se llevó a cabo un meta-análisis integrando los resultados de la investigación llevada a cabo en los últimos años en España.

A nivel internacional se han llevado a cabo recientemente diversos meta-análisis sobre programas preventivos del consumo de sustancias en el ámbito escolar. A pesar de existir soporte científico que avala la eficacia de determinadas técnicas psicológicas en el tratamiento de las conductas adictivas, las técnicas conductuales muestran mejores resultados cuando son utilizadas dentro de programas multimodales o multicomponentes más amplios (Secades y Fernández, 2001; 2003; 2006). Sin embargo, en nuestro país hacía más de una década que no se analizan de forma cuantitativa las intervenciones preventivas para conocer la eficacia de los programas en nuestro contexto. Por lo tanto, era necesario contar con nuevas evidencias sobre las características que afectan a una mayor eficacia en los programas que se están aplicando y así poder optimizar recursos. El primer estudio de esta tesis consitió en determinar la eficacia de los programas preventivos del consumo de drogas aplicados con adolescentes españoles, de entre 10 y 19 años, en el ámbito escolar y que hubieran sido publicados entre 2002-2013 y analizar las variables que modulan su eficacia preventiva.

Este estudio aporta datos hasta ahora no conocidos sobre la eficacia de los programas de prevención en los últimos doce años en España y contribuye a integrar los hallazgos de los estudios que se han llevado a cabo en la última década, con una métrica común, permitiendo hallar relaciones entre las características de los estudios y los resultados obtenidos. En los últimos años se ha producido un incremento de la calidad metodológica de los estudios de prevención de consumo de sustancias en adolescentes. Los programas se muestran más eficaces a corto plazo para prevenir el consumo de alcohol y modificar la actitud hacia las drogas. Los programas basados en las teorías del aprendizaje social obtienen los mejores resultados y aquellos aplicados por profesionales y profesores conjuntamente son los que presentan mayor eficacia.

A partir de los datos se puede concluir que la eficacia global de la prevención escolar de nuestro país no ha variado sustancialmente durante la última década si se compara con un meta-análisis anterior (Espada et al., 2002). Asimismo, a partir de los resultados es posible determinar la necesidad de realizar evaluaciones más rigurosas de las intervenciones, controlando la fidelidad e integridad de las aplicaciones para poder implantar programas bien establecidos y controlar el efecto de variables que pueden influir en la eficacia de los resultados. Además, dicho control resulta fundamental para valorar en investigaciones futuras los resultados de los programas y conocer su utilidad, así como para su posible replicabilidad.

El *segundo objetivo* consistió en aportar nuevas evidencias sobre los factores de riesgo asociados al inicio del consumo de tabaco y su relación con la intensidad del mismo. Para ello se evaluó el estado de ánimo de adolescentes fumadores y se comparó con el de adolescentes no fumadores. Además, se evaluó la intensidad de consumo y su relación con el estado de ánimo depresivo.

Actualmente las medidas de mayor impacto para reducir la prevalencia del tabaquismo en población adolescente son las políticas dirigidas al control de la publicidad. Sin embargo, dichas políticas no ofrecen herramientas en la práctica clínica para orientar la acción preventiva frente a los adolescentes que se encuentran en riesgo de iniciar el consumo. Son diversos los factores relacionados con el inicio consumo de tabaco (Alba, 2007; Secades-Villa, García-Rodríguez, Fernández-Hermida y Carballo, 2007), que van desde los rasgos de personalidad (Fernández, López-Durán, Martínez y Becoña, 2016; Gonzálvez, Espada, Guillén-Riquelme, Secades y Orgilés, 2016), el estilo educativo de los padres (Martínez-Loredo, 2016) o la sensibilidad a la ansiedad (Vispo, del Río, López-Durán y Becoña, 2016), entre otros. A pesar de conocer que el inicio del hábito es un fenómeno complejo, multifactorial y multidimensional, el análisis de esos factores permitiría avanzar en la estructura de las intervenciones dirigidas a adolescentes. El segundo objetivo de esta tesis consistió en evidenciar la relación entre el estado de ánimo, como factor de riesgo para el consumo, y el tabaquismo. Asimismo, el estudio que compuso este objetivo se centró en comprobar si los fumadores

presentaban mayor intensidad de consumo con peor estado de ánimo, así como determinar su capacidad predicitva.

A partir de los resultados encontrados es posible concluir que el estado de ánimo es predictor de la frecuencia e intensidad del consumo de tabaco, existiendo mayor probabilidad de fumar en presencia de bajo estado de ánimo. Los adolescentes con mejor estado anímico presentan menor intensidad de consumo en todas las variables evaluadas.

El estudio aporta además la cuantificación de su capacidad predictiva. El modelo estudiado resulta significativo en el consumo diario, durante el último mes y alguna vez en la vida, confirmando la importancia de tener en cuenta los síntomas depresivos a la hora de llevar a cabo intervenciones preventivas en población adolescente.

Estos resultados confirman los obtenidos en otros estudios con población adulta, en el que se encontró que el abandono del tabaco estaba asociado con una disminución de la sintomatología depresiva, asociándose a su vez las recaídas con un aumento de dicha sintomatología (Rodríguez-Cano et al., 2016). Resulta, por tanto, de especial relevancia, el abordaje de la sintomatología depresiva en el tratamiento del consumo de tabaco.

El *tercer objetivo* fue evaluar la eficacia a corto y largo plazo de Proyecto EX, un programa para la prevención y el abandono del consumo de tabaco. En el primer estudio se evaluó el efecto del programa en su versión clínica de manera inmediata y a los seis meses de su aplicación, mientras que el segundo estudio se centró en evaluar los efectos del programa al año de seguimiento. Un tercer estudio puso a prueba la dependencia a la nicotina como variable mediadora de los efectos del programa. El cuarto estudio consistió en la adaptación e implementación del programa en su versión para el aula, donde se interviene conjuntamente con escolares fumadores y no fumadores, y el análisis de sus efectos al año de seguimiento.

El tabaco y el alcohol son las sustancias más consumidas en la adolescencia y la prevención y el control del consumo de tabaco es una de las necesidades de salud pública más acuciantes (Meneses et al., 2013; Observatorio Español sobre

Drogas, 2013). El tabaquismo en un trastorno adictivo crónico (Bello, 2011; Lekuona, Salcedo, Morillas y Umaran, 2009) y se ha convertido en una epidemia pediátrica en España, ya que, como en otras partes del mundo, la mayoría de nuevos fumadores comienzan a fumar en edad escolar (Rodríguez, López, López y García, 2013). La educación sobre el tabaco puede ser más fructífera si se proporciona antes de la edad adulta, con el fin de evitar consecuencias físicas acumulativas, además de los costes económicos y sociales (Sussman, Miyano, Rorhbach, Dent y Sun, 2007). Sin embargo, aunque algunos programas preventivos relacionados con el consumo de tabaco han sido evaluados (p.ej., Espada, Orgilés, Méndez, García-Fernández e Inglés, 2008), no existen programas de tratamiento bien establecidos para el cese de consumo de tabaco de los adolescentes en España.

El tercer objetivo de esta tesis responde a la necesidad de contar con programas eficaces en España para la prevención y el tratamiento del consumo de tabaco en adolescentes. Los dos primeros estudios consistieron en evaluar de manera inmediata y a los seis y doce meses de seguimiento la eficacia de la versión clínica de Proyecto EX, un programa que se ha mostrado eficaz entre adolescentes en los EE.UU. (Sussman, Dent y Lichtman, 2001), China (Zeng et al., 2004), Rusia (Idrisov et al., 2014), Tailandia (Chansatitporn et al., 2016), e India (Sidhu, Sussman, Tewari, Bassi y Arora, 2016).

El programa Proyecto EX en su versión clínica con escolares españoles ha mostrado ser efectivo para la reducción en la intención de fumar y en los niveles de dependencia a la nicotina, tanto a corto plazo como en la evaluación de seguimiento, además de aumentar la capacidad para dejar de fumar de los adolescentes. Con respecto al cese del consumo, el programa produce tasas de abandono del consumo de tabaco en comparación con aquellos adolescentes que no reciben el programa, entre los que no se observa ningún caso de abandono. Por tanto, a partir de los resultados, es posible concluir que Proyecto EX en su versión clínica puede ser utilizado como una intervención efectiva para el tratamiento del consumo de tabaco en adolescentes españoles.

Con la finalidad de evaluar los efectos mediadores sobre la eficacia del programa y comprender el éxito del mismo, el quinto estudio se centró en poner a

prueba la dependencia a la nicotina como mediadora de los efectos de Proyecto EX para reducir el consumo de tabaco en adolescentes. Los resultados sugieren que las intervenciones que reducen la dependencia a la nicotina a corto plazo tienen mayor probabilidad de éxito para reducir el consumo a largo plazo. La dependencia a la nicotina es un proceso central que subyace al motivo por el que una persona mantiene su consumo (Becoña, Nogueiras, Flórez, Álvarez y Vázquez, 2010), por lo que se convierte en la principal variable que dificulta el abandono del tabaco y, por tanto, de especial interés a la hora de llevar a cabo las intervenciones.

Una vez comprobada la eficacia de la versión clínica de Proyecto EX, resultó de interés concluir este trabajo con un sexto estudio, cuyo objetivo consistió en adaptar e implementar la versión de Proyecto EX para el aula y analizar su eficacia en adolescentes españoles. Teniendo en cuenta la necesidad de conocer los efectos del programa en un periodo mayor de tiempo, ya que los cambios en el consumo o en el cese del consumo normalmente se observan en el seguimiento (Dijk, Reubsaet, de Nooijer y de Vries, 2007; Griffin, Botvin, Scheier y Nichols, 2002), en este último estudio se evalúa la eficacia de Proyecto EX en su versión clase a los doce meses de seguimiento.

Tras un año de la implementación del programa, los participantes de la condición experimental presentaron una mayor reducción en la dependencia a la nicotina y en los niveles de monóxido de carbono, así como un menor consumo de cigarros en el último mes.

En base a los resultados, es posible concluir que el programa Proyecto EX en su versión clase (preventiva-terapéutica) es eficaz para reducir la intención de consumo de tabaco y los niveles de monóxido de carbono en aire espirado. La aplicación de Proyecto EX en su versión clase ha mostrado resultados relevantes para su establecimiento como programa para el cese y la prevención del consumo de tabaco en adolescentes españoles.

Limitaciones y líneas futuras

Los estudios presentados contribuyen al conocimiento sobre la eficacia de los programas preventivos del consumo de drogas aplicados con adolescentes españoles y las condiciones que influyen en la misma, al tiempo que permiten conocer la relación entre el estado de ánimo, como factor de riesgo, y el consumo de tabaco, así como contar con un programa de eficacia probada tanto para el cese como para la prevención del consumo de tabaco en adolescentes españoles. Sin embargo, a partir de los resultados hallados se identifican algunas limitaciones y se proponen líneas de investigación futuras.

En primer lugar, muchos de los estudios acerca de la eficacia preventiva de los programas aplicados en España no pudieron incluirse en la revisión cuantitativa debido a las carencias metodológicas de los mismos. Además, los estudios incluidos también presentan ciertas limitaciones. Existen muchos estudios que constatan sólo aquello que funciona y otros con problemas a nivel metodológico, lo que nos obliga a ser cautelosos a la de hora de concluir determinados aspectos sobre las evidencias.

En segundo lugar, y respecto al análisis realizado sobre es estado de ánimo y el consumo de tabaco, es necesario tener en cuenta que el estado de ánimo puede sufrir variaciones a lo largo del tiempo, sobre todo en la etapa adolescente, en la que se producen continuamente cambios emocionales. La naturaleza transversal del estudio no permite establecer la relación causal entre el consumo de tabaco y el estado de ánimo.

Con respecto a la muestra objetivo de esta tesis cabe destacar que se trata de adolescentes escolarizados, por lo que los resultados y conclusiones no son generalizables a otros grupos de adolescentes. Teniendo en cuenta que la educación secundaria es obligatoria en España, este grupo representa un porcentaje significativo de los adolescentes de nuestro país. Por otro lado, el reclutamiento de la muestra se llevó a cabo en la provincia de Alicante, hecho que puede limitar su generalización al resto de población adolescente. Asismismo, es considerable la pérdida muestral que se produce a lo largo de las evaluaciones, en su mayoría debido al absentismo escolar. Para futuras implementaciones

resultaría de interés establecer colaboración con diferentes provincias españolas para así poder replicar ambos programas a nivel nacional, así como contar con reforzadores de tipo material para evitar grandes pérdidas muestrales. Cabe destacar además que no se llevó a cabo una evaluación de la fidelidad de la implementación, teniendo en cuenta que determina en gran medida el éxito de las intervenciones. Es necesario controlar la fidelidad e integridad de las aplicaciones para poder implementar programas bien establecidos y controlar el efecto de las diversas variables que pueden influir en la eficacia de los resultados. Para valorar adecuadamente los resultados de los programas de prevención del abuso de drogas y conocer su utilidad resulta imprescindible que los estudios informen adecuadamente sobre el diseño y metodología de los mismos.

UNIVERSITAS Miguel Hernández

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APÉNDICE

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FICHA DE DATOS PERSONALES

CÓDIGO PERSONAL

*Pregúntale a tu monitor por el tuyo

INICIALES ***Nombre y apellidos**		**FECHA DE HOY:**	
NOMBRE		**APELLIDOS**	
SEXO	**□ Hombre** **□ Mujer**		
DIRECCIÓN DEL DOMICILIO (Calle/ Avenida/ Travesía/ Carretera, Plaza)			

NÚMERO		**PUERTA**		**COD. POSTAL**	
CIUDAD		**PROVINCIA**		**NACIONALIDAD**	
FECHA NACIMIENTO		**EDAD**			
TELÉFONO FIJO		**MÓVIL**			
CORREO ELECTRÓNICO					

Los datos por usted facilitados serán tratados con la máxima confidencialidad y secreto, cumpliendo en todo caso con las normas y estándares de seguridad que regula la normativa de protección de datos, siendo de aplicación el nivel de seguridad alto. Los datos facilitados por usted en los respectivos cuestionarios de evaluación, son veraces, reales y exactos, eximiéndonos por lo que los daños y perjuicios que el error u omisión pudieran ocasionar.

REDES SOCIALES	Si tienes cuenta de facebook o tuenti, por favor, indica tu nombre de usuario.
facebook	
tuenti	
Otras:	

PERSONAS DE CONTACTO

Tu opinión es importante para nosotros. Tu participación en este estudio tiene el objetivo de prevenir, detener o reducir el consumo de tabaco. Deseamos solicitar de nuevo tu colaboración dentro de un año. Por favor, indica al menos dos personas de confianza con las que podamos contactar para localizarte. Recuerda que tus datos son confidenciales.

TIPO PARENTESCO **(padre, madre, herman@, prim@, amig@)**	**NOMBRE**	**TELÉFONO**	**CORREO ELECTRÓNICO**

El firmante se compromete a informar de los extremos de este documento a los terceros cuyos datos hayan sido cumplimentados en este formulario en el apartado de "personas de contacto", siendo los responsable en todo caso el firmante de este documento.

Firmado: _____

¡GRACIAS POR TU COLABORACIÓN!

CUESTIONARIO SOCIODEMOGRÁFICO

1. ¿Cuál es tu nacionalidad?

Por favor, señala la categoría que mejor se adapte a tu caso. Si señalas "b" (otra) por favor, especifica la nacionalidad.

a. Español/a.
b. Otra (especifica):_____

2. ¿Con quién vives? (*Señala una opción).*

a. Ambos padres.
b. Sólo con mi madre (o madrastra).
c. Sólo con mi padre (o padrastro).
d. A veces con mi madre (o madrastra) y otras veces con mi padre (o padrastro).
e. Otra(s) persona(s).
f. Sólo.

2b. Mis padres son de nacionalidades diferentes.

a. Sí Mi padre es: _____
Mi madre es: _____

b. No

3. ¿Cuál es el nivel profesional de tu padre?

a. Nivel superior (médico, abogado, dueño de un negocio grande).
b. Nivel medio (maestro, enfermero).
c. Dueño de un negocio pequeño, gerente.
d. Secretario, vendedor.
e. Trabajador cualificado (electricista, fontanero, sastre, mecánico, camionero, recluta militar).
f. Trabajador semi-cualificado (maquinista, cocinero, camarero).
g. Trabajador no cualificado.
h. Desempleado, pensionista.
i. Amo de casa.

4. ¿Cuál es el nivel profesional de tu madre?

a. Nivel superior (médico, abogada, dueña de un negocio grande).
b. Nivel medio (maestra, enfermera).
c. Dueña de un negocio pequeño, gerente.
d. Secretaria, vendedora.
e. Trabajadora cualificada (electricista, fontanera, sastre, mecánica, camionera, recluta militar).
f. Trabajadora semi-cualificado (maquinista, cocinera, camarera).
g. Trabajadora no cualificado.
h. Desempleada, pensionista.
i. Ama de casa.

5. ¿Cuál es el nivel de estudios de tu padre?

a. No terminó educación primaria (colegio).
b. No terminó educación secundaria (instituto).
c. Terminó educación secundaria (instituto).
d. Formación profesional.
e. Educación superior.

6. ¿Cuál es el nivel de estudios de tu madre?

a. No terminó educación primaria (colegio).
b. No terminó educación secundaria (instituto).
c. Terminó educación secundaria (instituto).
d. Formación profesional.
e. Educación superior.

7. ¿Cuántas asignaturas suspendiste en la última evaluación? ____

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CUESTIONARIO DE CONSUMO

1. ¿A qué edad fumaste tu primer cigarrillo? ____

a. Nunca he fumado.
b. Tenía ____ años.

2. Por lo general, ¿cuántos cigarrillos fumas al día? ____

3. ¿Cuántos cigarrillos fumaste ayer? ____

4. ¿Cuántos cigarrillos has fumado en los últimos 7 días? ____

5. ¿Cuántas veces has fumado en el último mes (0-+100 veces)?_____

6. ¿Cuántas días del último mes has fumado (0-30 días)?_____

7. ¿Cuántos cigarrillos has fumado en el último mes?

0, 1-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70, 71-80, 81-90, 91-100, +100

8. ¿Has fumado hoy?

___ Sí ___ No

9. ¿Cuántas veces has bebido alcohol en el último mes (30 días)?

_____ (de 0 a +100 veces).

10. ¿Cuántas veces has consumido porros en el último mes (30 días)?

_____ (de 0 a +100 veces).

11. ¿Cuántas veces has consumido otras drogas (cocaína, estimulantes, inhalantes, alucinógenos, ansiolíticos, sedantes o somníferos u opiáceos) en el último mes (30 días)?

_____ (de 0 a +100 veces).

INTENCIÓN DE CONSUMO

1. ¿Cuál de las siguientes opciones describe mejor tus pensamientos sobre dejar de fumar? (Por favor, elige <u>UNA</u> opción).

a. No he fumado nunca.
b. Nunca he dejado en dejar de fumar.
c. He pensado en dejar de fumar y he decidido que no quiero hacerlo.
d. He pensado en dejar de fumar pero no he tomado una decisión.
e. Planeo dejar de fumar pero más adelante.
f. Planeo dejar de fumar de inmediato.
g. Estoy dejando de fumar.
h. He dejado de fumar y trato de no volver a hacerlo.

2. ¿Cómo de probable es que fumes en los próximos 12 meses? Tú dirías que…

a. Definitivamente no.
b. Probablemente no.
c. Un poco probable.
d. Algo probable.
e. Es muy probable.

3. ¿Crees que dejarás alguna vez de fumar?

a. Sí, ya lo he hecho.
b. Sí, posiblemente más adelante.
c. Sí, en las próximas semanas.
d. Quizá.
e. No.
f. No fumo.

4. ¿Cuántas veces has intentado dejar de fumar en tu vida?

a. No fumo.
b. Más de 5 veces.
c. 3 ó 4 veces.
d. 1 ó 2 veces.
e. Nunca.

5. Si has intentado dejar de fumar, ¿cuál es el mayor número de días que has estado sin hacerlo?

a. No fumo.
b. ____ días.
c. Nunca he intentado dejarlo.

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TEST DE DEPENDENCIA A LA NICOTINA DE FAGERSTRÖM

1. ¿Cuántos cigarrillos fumas al día?
- a. Más de 26 cigarrillos al día.
- b. Entre 16-25 cigarrillos al día.
- c. Entre 1-15 cigarrillos al día.
- d. Menos de 1 al día.

2. Después de levantarte por la mañana, ¿cuándo te fumas el primer cigarrillo?
- a. En los primeros 30 minutos.
- b. 30 minutos después de levantarte pero antes del mediodía.
- c. Por la tarde.
- d. Por la noche.
- e. No fumo.

3. ¿A qué cigarrillo renunciarías?
- a. Al primer cigarrillo de la mañana.
- b. Cualquiera antes del mediodía.
- c. Cualquiera durante la tarde.
- d. Cualquiera durante la noche.
- e. No fumo.

4. ¿Te resulta difícil no fumar en lugares en los que está prohibido (biblioteca, cines, restaurantes, etc.)?
- a. Sí, muy difícil.
- b. Sí, un poco difícil.
- c. No, no suele ser difícil.
- d. No, en absoluto.

5. Si estás enfermo/a en la cama durante la mayor parte del día, ¿fumas?
- a. Sí, siempre.
- b. Sí, bastante a menudo.
- c. No, normalmente.

6. ¿Fumas más durante las dos primeras horas del día que durante el resto del día?
- a. Sí.
- b. No.

7. Si has intentado dejar de fumar, ¿cómo de difícil te resultó?
- a. Nada difícil.
- b. Algo difícil.
- c. Bastante difícil.
- d. Muy difícil.
- e. Nunca he intentado dejar de fumar.

8. De las cinco personas más cercanas a ti (familia y amigos), ¿cuántos son fumadores?

a. Cinco.
b. Cuatro.
c. Tres.
d. Dos.
e. Uno.
f. Ninguno.

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MOTIVACIÓN PARA DEJAR DE FUMAR

1. **¿Cuánta energía tienes para dejar el tabaco ahora y/o para mantenerte sin fumar?**
   a. Mucha.
   b. Alguna.
   c. Poca.
   d. Ninguna.

2. **¿Cuánto te esforzarás en dejar de fumar ahora y/o mantenerte sin fumar?**
   a. Mucho.
   b. Algo.
   c. Un poco.
   d. Nada.

3. **¿Cuánta ayuda sientes que estás recibiendo para dejar de fumar ahora y/o mantenerte sin fumar?**
   a. Mucha.
   b. Algo.
   c. Un poco.
   d. Nada.

4. **¿En qué medida deseas dejar de fumar ahora y/o mantenerte sin fumar?**
   a. Mucho.
   b. Algo.
   c. Un poco.
   d. Nada.

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VALORACIÓN DE LA CALIDAD DE LAS SESIONES

1. ¿Ha sido el programa útil para dejar de fumar?

(Nada) 1 2 3 4 5 6 7 8 9 10 (Mucho)

2. ¿Cómo de interesantes fueron las sesiones?

(Nada) 1 2 3 4 5 6 7 8 9 10 (Mucho)

3. ¿Cuánto te gustaron las sesiones?

(Nada) 1 2 3 4 5 6 7 8 9 10 (Mucho)

4. ¿Cómo de informativas fueron las sesiones?

(Nada) 1 2 3 4 5 6 7 8 9 10 (Mucho)

5. ¿Han estado bien organizadas las sesiones?

(Nada) 1 2 3 4 5 6 7 8 9 10 (Mucho)

6. ¿Cuánto aprendiste en las sesiones?

(Nada) 1 2 3 4 5 6 7 8 9 10 (Mucho)

7. ¿Cuánto de motivado estaba el monitor?

(Nada) 1 2 3 4 5 6 7 8 9 10 (Mucho)

8. ¿Cómo de bien informado estaba el monitor?

(Nada) 1 2 3 4 5 6 7 8 9 10 (Mucho)

9. De las siguientes acciones, ¿a qué te ha ayudado el Proyecto EX?

(Por favor, señala la mejor opción en tu caso).

a. Dejar de fumar definitivamente.
b. Reducir el consumo de tabaco CON la intención de dejarlo completamente.
c. Reducir el consumo de tabaco SIN la intención de dejarlo completamente.
d. Dejar de fumar en las próximas dos semanas.
e. Dejar de fumar en un futuro.
f. Fortalecer tu compromiso de seguir sin fumar (si ya lo has dejado).
g. Fortalecer tu compromiso de seguir sin fumar (si nunca has fumado).
h. Otra (especifícala) _____

VALORACIÓN DE LAS ACTIVIDADES DEL PROGRAMA

1. **Programa de Entrevistas: ¡Dichosos fumadores!: Familiares y amigos se enfrentan a los fumadores por culpa del tabaco**

   (Muy mala) 1 2 3 4 5 6 7 8 9 10 (Muy buena)

2. **Programa de Entrevistas: El tabaco puede estar estresándote**

   (Muy mala) 1 2 3 4 5 6 7 8 9 10 (Muy buena)

3. **Respiración Saludable**

   (Muy mala) 1 2 3 4 5 6 7 8 9 10 (Muy buena)

4. **Juego: ¿Hay tabaco en el menú?**

   (Muy mala) 1 2 3 4 5 6 7 8 9 10 (Muy buena)

5. **Programa de Entrevistas: Dejar de fumar: yo lo hice y me siento mejor**

   (Muy mala) 1 2 3 4 5 6 7 8 9 10 (Muy buena)

6. **Yoga**

   (Muy mala) 1 2 3 4 5 6 7 8 9 10 (Muy buena)

7. **Meditación**

   (Muy mala) 1 2 3 4 5 6 7 8 9 10 (Muy buena)

8. **Programa de Entrevistas: ¡Atención! No dejar de fumar puede ser perjudicial para tu mente**

   (Muy mala) 1 2 3 4 5 6 7 8 9 10 (Muy buena)

9. **Por favor, valora las sesiones del Proyecto EX con una escala de 1 (tu preferida) a 8 (la menos favorita). No valores las sesiones a las que no asististe o no recuerdas.**

   Sesión Uno: Orientación

   Sesión Dos: El tabaco te afecta

   Sesión Tres: Tabaco y Salud

   Sesión Cuatro: Dejándolo Paso 1- Comprometerse

   Sesión Cinco: Dejándolo Paso 2- Manejar el síndrome de abstinencia

   Sesión Seis: Cuidando tu cuerpo

   Sesión Siete: Cuidando tu mente

   Sesión Ocho: Evitando Recaídas

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CED-D

CENTER FOR EPIDEMIOLOGIC STUDIES DEPRESSION SCALE VERSIÓN BREVE

1. ¿Con qué frecuencia sientes que no puedes quitarte de encima la tristeza aún con la ayuda de tu familia y amigos?

a. Menos de 1 día.
b. 1-2 días.
c. 3-4 días.
d. 5-7 días.

2. ¿Con qué frecuencia te has sentido deprimido?

a. Menos de 1 día.
b. 1-2 días.
c. 3-4 días.
d. 5-7 días.

3. ¿Con qué frecuencia piensas que tu vida ha sido un fracaso?

a. Menos de 1 día.
b. 1-2 días.
c. 3-4 días.
d. 5-7 días.

4. ¿Con qué frecuencia te sientes solo?

a. Menos de 1 día.
b. 1-2 días.
c. 3-4 días.
d. 5-7 días.

5. ¿Con qué frecuencia te sientes triste?

a. Menos de 1 día.
b. 1-2 días.
c. 3-4 días.
d. 5-7 días.

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