Universidad de Oviedo

Evaluación de la Personalidad Emprendedora

Assessment of Enterprising Personality

Doctorando: Javier Suárez Álvarez

Programa de doctorado: Psicología

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RESUMEN DEL CONTENIDO DE TESIS DOCTORAL

1.- Título de la Tesis	
Español/Otro Idioma: Evaluación de la Personalidad Emprendedora	Inglés: Assessment of Enterprising Personality

2.- Autor	
Nombre: Javier Suárez Álvarez	DNI/Pasaporte/NIE:
Programa de Doctorado: Psicología	
Órgano responsable: Departamento de Psicología	

RESUMEN (en español)

Antecedentes: El espíritu emprendedor es fundamental para el bienestar social y económico internacional ya que supone una fuente de empleo, innovación y crecimiento en la mayor parte de las sociedades modernas. El fracaso de una persona emprendedora, ya sea de índole empresarial o de cualquier otro tipo, supone un coste para la sociedad en cuanto a pérdida de recursos y oportunidades y perjudica a las personas tanto económicamente como psicológicamente. Las perspectivas económicas y sociológicas han contribuido sustancialmente al desarrollo teórico del proceso emprendedor, mientras que la Psicología es quien ha tomado las riendas en los últimos años destacando por su aportación en la evaluación de la personalidad emprendedora. Hasta la fecha no existe en España una batería de pruebas que permita evaluar de forma válida y fiable todos los rasgos de la personalidad emprendedora en jóvenes. Para ello se han venido empleando los tests clásicos de Personalidad, pero su capacidad predictiva es muy escasa, debido a que los rasgos que miden son demasiado generales para predecir la conducta emprendedora. Por tanto, el objetivo principal de esta Tesis Doctoral es desarrollar una nueva prueba para evaluar la Personalidad Emprendedora, aplicando para ello los desarrollos Psicométricos más recientes.

Método: Se realizó una revisión exhaustiva sobre el constructo del espíritu emprendedor y se propuso un nuevo modelo de evaluación de la personalidad emprendedora inspirado en los modelos ya existentes. La primera fase consistió en la construcción de un banco compuesto por 161 ítems de tipo Likert con cinco categorías de respuesta. A continuación se realizaron

varios pilotajes cualitativos y cuantitativos utilizando una muestra de 416 adolescentes españoles (54% hombres; M = 17,89; DT = 3,26). La segunda fase consistió en determinar las propiedades psicométricas del banco de ítems y la elaboración de una prueba válida y fiable para evaluar la personalidad emprendedora en jóvenes. Para ello se utilizó una muestra estratificada de 2693 adolescentes españoles.

Resultados: Los coeficientes de fiabilidad de las escalas de la batería están por encima de .80, y todas ellas presentan una estructura interna esencialmente unidimensional (GFI > .95; RMSR < .08; Varianza explicada superior al 30%). La batería global tiene un coeficiente de fiabilidad elevado (α = .92), y las ocho escalas conforman un factor único de segundo orden que explica el 50.32% de la varianza. La varianza común entre las ocho dimensiones de personalidad y los Big Five de la personalidad fue del 24%, y con tres dimensiones de inteligencia emocional fue del 16%. La personalidad emprendedora tiene una correlación muy baja con el nivel socioeconómico (r = .126) y moderada con el espíritu emprendedor estimado por los profesores (r = .385), la propia autovaloración de las personas (r = ,436), las notas académicas en Matemáticas (r = .362) y en Lengua y Literatura (r = .513). En lo que respecta a la educación y formación en jóvenes, la motivación, el autoconcepto y las expectativas son predictores significativos del rendimiento académico y tienen un mayor poder predictivo que el nivel socioeconómico de los estudiantes.

Conclusiones: Se han identificado ocho dimensiones específicas de la personalidad emprendedora en jóvenes: Motivación de logro, autoeficacia, toma de riesgos, innovación, autonomía, tolerancia al estrés, locus de control interno y optimismo. Se desarrolló una nueva batería compuesta por 87 ítems con unas adecuadas propiedades psicométricas para la evaluación de la personalidad emprendedora en jóvenes. Se han identificado diferentes aspectos que podrían ser considerados relevantes para el diseño de programas para la educación y formación en habilidades emprendedoras. Finalmente, se discuten las implicaciones y beneficios tanto teóricos como aplicados que se derivan de los resultados obtenidos en esta Tesis Doctoral.

RESUMEN (en Inglés)

Background: Entrepreneurship is fundamental for international social and economic well-being, since it is a source of employment, innovation and growth in modern societies. The failure of an enterprising person, either of a business nature or otherwise, involves a cost to society in terms of lost opportunities and resources, and is both economically and psychologically detrimental to the individual. Economic and sociological approaches have contributed substantially to the development of theories of enterprising processes, while Psychology has taken the reins in recent years, notably for its contribution to the assessment of enterprising personality. Currently, there is no valid and reliable measurement instrument in Spain for the assessment of such an important variable as the enterprising personality in young people. Thus far, classic personality tests have been used, but their predictive validity is very low, and so the traits measured have been too general to predict enterprising behaviour. Therefore, the main goal of this Doctoral Dissertation is to develop a new measurement instrument to assess enterprising personality, by applying the latest psychometric developments.

Method: An exhaustive review of the entrepreneurship construct was carried out, and a new model of enterprising personality inspired by existing models was proposed. The first step was the development of an item bank comprising 161 items with 5-point Likert-type response scales. Several qualitative and quantitative pilot studies were then carried out on a sample of 416 Spanish adolescents (54% male; M = 17.89; DT = 3.26). The second step was the estimation of the psychometric properties of the item bank and the creation of a valid and reliable measurement instrument to assess enterprising personality in young people. In order to do that a stratified sample of 2693 Spanish adolescents (51% men; M = 16.52; DT = 1.38) was used.

Results: The reliability coefficients of the battery scales were higher than .80, and all of them demonstrated an essentially one dimensional internal structure (GFI > .95; RMSR < .08; Explained variance higher than 30%). The global battery has a high reliability coefficient (α =

.92), and the eight scales can be summarised in a second order general factor that explains 50.32% of the variance. Common variance among the eight enterprising personality dimensions and the Big Five factors was 24%, and with three emotional intelligence dimensions it was 16%. The enterprising personality traits show very little correlation with socio-economic status (r = .126), and a moderate correlation with teachers' estimations of enterprising spirit (r = .385), self-evaluations (r = .436), student grades in Mathematics (r = .362), and Spanish Language and Literature (r = .513). In terms of education and training in young people, motivation, self-concept and expectations are significant predictors of academic performance, and they have more predictive power than student socioeconomic status.

Conclusions: Eight specific dimensions of enterprising personality in young people have been identified: Achievement motivation, self-efficacy, risk-taking, innovativeness, autonomy, stress tolerance, internal locus of control, and optimism. A new battery composed of 87 items with adequate psychometric properties for the assessment of enterprising personality was developed. Various aspects that may be considered relevant to the design of education and training programs in enterprising skills have been identified. Finally, the theoretical and practical implications and benefits of the results obtained in this Doctoral Dissertation are discussed.

SR. DIRECTOR DE DEPARTAMENTO DE PSICOLOGIA
SR. PRESIDENTE DE LA COMISIÓN ACADÉMICA DEL PROGRAMA DE DOCTORADO EN PSICOLOGIA

Agradecimientos

Recuerdo que desde que escuché por primera vez la famosa frase de Ortega y Gasset me quedó grabada a fuego: "Yo soy yo y mi circunstancia y si no la salvo a ella no me salvo yo". Mi circunstancia es la suma de una serie de escenarios y personas que no sólo han hecho este viaje posible sino que además lo han convertido en una experiencia inolvidable. Las grandes cumbres se consiguen en compañía y mi mayor mérito es haber sabido rodearme de los mejores.

Existen al menos tres escenarios, inevitablemente entrelazados, que permiten entender mi circunstancia. El primero es sin duda a quien más le debo lo que tengo. Lo bueno de lo que soy es gracias a vosotros. Mamá, me sorprendes cada día con tu capacidad de entrega y amor desproporcionado hacia los demás. Cuidadora infatigable y fuente de ilusión infinita. Papa, ejemplo de trabajo duro y sacrificio, siempre pusiste a la familia por delante de tu bienestar y eso te honra como persona pero mucho más como padre. Estoy muy orgulloso de vosotros. Lo disteis todo para que tuviéramos la vida que queríamos, ya lo habéis conseguido, ahora os toca disfrutar a vosotros. Toni, Emma y Viti, habéis sido hermanos mayores y padres, me habéis enseñado a sumar, a decidir y a disfrutar de la vida. Cuñados Ana y Pedro, habéis sido, sois y seréis como hermanos. Espero que el salto generacional de 20 años que tenemos entre nosotros me sirva también para ayudar a vuestros hijos tanto como que me ayudasteis a mí. Ander, Cris, Samu, Juan, Freya y Sandra, os vigilaré de cerca, para lo bueno y para lo malo. Güela, la más cuerda de toda la familia, sin ti las cosas serán más difíciles a partir de ahora. Me tuviste de la mano desde que llegué al mundo y me alegra que no la hayas soltado hasta que te fuiste. Junto al Güelu y Marilé, sois parte de mí y nunca os olvidaré, recordaros será motivación suficiente para no rendirse. Al resto de familia, primos y tíos, hacéis que nuestras caóticas y numerosas reuniones se echen mucho de menos cuando se está fuera.

El segundo escenario ha servido como una extensión de mi familia en multitud de ocasiones. Mis padres académicos, Eduardo y Pepe, ambos tan necesarios como complementarios. Eduardo, amigo, mentor y primer causante de que haya llegado hasta donde estoy hoy. En nueve años de relación me has enseñado muchas cosas, por no decir casi todas, pero sin duda destaco el espíritu de cuestionar lo incuestionable aunque eso se volviese contra ti y desencadenase estimulantes (y frecuentes) discusiones. Tuyo es el mérito de haber despertado mi interés por la investigación y del paciente trabajo de crianza formativa. Pepe, no me imagino este viaje sin tu dirección, fuente infinita de tranquilidad y optimismo. Disponibilidad absoluta, consuelo en la distancia y cercano en la compañía. Un buen ejemplo de *areté* griego. Tu arte para hacer sencillo lo complejo permite trabajar por encima de nuestras posibilidades. Generáis escuela y es un placer y privilegio ser parte de vuestro legado. Nacho, hermano de batallas, diferentes en algunas cosas pero siempre en sintonía. Al igual que Quijote y Sancho, hemos

combatido molinos que hubieran sido imposibles de derrotar sin tu ayuda. Sin duda tú aportas la cordura de Sancho y la elegancia de Quijote. En el fondo sé que echaras de menos escuchar a Bob Dylan trabajando y yo compartir *corner* contigo pero estoy convencido de que encontremos motivos para nuevas aventuras. Luisma, hermano mayor, la voz de la empatía. Has conseguido que ir a un congreso tenga un valor añadido por el hecho de encontrarnos. Hemos compartido inquietudes, experiencias y carcajadas que en momentos de desaliento han sido como encontrar agua en el desierto. Luis, tío y padrino, tu apoyo en el terreno personal y profesional han sido fundamentales. Has ayudado a manejar el timón en tiempo de tormenta pero sin duda valoro aún más los cafés con anécdota incluida. Rubén, has pasado de jefe a amigo, gracias por toda tu ayuda y en especial por todas las horas de sintaxis que terminaron en *simposio.* Ron y Steve, mis tíos americanos, fuisteis jefes, compañeros y amigos cuando estaba sólo en mi aventura por USA y aún lo seguís siendo. Es incuantificable lo que aprendí tanto personal como profesionalmente, incluso como para volver a pasar un invierno a -30º. *I´m proud to be part of the UMass family*. Berto, amigo y aliado, de carrera y doctorado, fuera y dentro de la facultad, junto a PGasalla, Marta, Cami, Carla, Sara Eva, Irene, Sergio y todos los que ayudaron a que nunca faltara aporte calórico ni hidratación en la travesía, gracias.

Mis padres solían preguntarme, ¿con quién sales hoy? Cuando comprobaron que mi respuesta era siempre la misma, dejaron de preguntar. Fer, Batalla, Noé, Cayado, Dani, Saúl, Lucho, Queve, Kike, Pela, Javi, Pablo, María, Pablín, Lore, Cris, Vane, Fru, Kiks, María, Martín Rico, Rizosina, Lucinda, Silvia y un largo etcétera. Con la mayoría ya van más de 24 años de amistad, muchos 20 de abril y dolores compartidos. Da igual quien esté en Londres, Ferrol, Chile, Berlín, León, Salamanca o USA, todo sigue igual cuando vuelves a casa, supongo que por eso sois los de siempre. A esta lista se suman otros muchos, Patry y VitiB, Pelli y la Collaciada, los parameros, Anonymous… También quiero agradecer a todos aquellos peregrinos con los que he compartido partes del camino y con los que guardo momentos que no olvidaré jamás. Todos habéis ayudado a que trabajar duro tuviera sentido.

Por último, quiero dar las gracias a todos los centros educativos y estudiantes que participaron en esta Tesis Doctoral. A todos los colaboradores que de forma desinteresada han hecho el trabajo más fácil. A la Consejería de Educación, Cultura y Deportes del Principado de Asturias por su inestimable ayuda y al Ministerio de Economía y Competitividad por financiar estos cuatro años de aventura.

Este es el secreto de mis éxitos, los errores son cosa mía.

A todos y cada uno, muchas gracias.

Índice de contenidos

1. Introducción

El espíritu emprendedor es fundamental para el bienestar social y económico internacional ya que supone una fuente de empleo, innovación y crecimiento en la mayor parte de las sociedades modernas (Baum, Frese y Baron, 2007; OECD/The European Comission, 2013). El fracaso de una persona emprendedora, ya sea de índole empresarial o de cualquier otro tipo, supone un coste para la sociedad en cuanto a pérdida de recursos y oportunidades y perjudica a las personas tanto económicamente como psicológicamente (Zhao, Seibert y Lumpkin, 2010).

La investigación sobre el espíritu emprendedor ha crecido exponencialmente y se han hecho importantes avances en los últimos años (Brandstätter, 2011; Chell, 2008; Hisrich et al., 2007 Rauch y Frese, 2007a, 2007b; Obschonka, Schmitt-Rodermund, Silbereisen, Gosling y Potter, 2013). Sin embargo, aquellas personas interesadas en investigar sobre el espíritu emprendedor aún tienen un largo camino que recorrer ya que todavía no se conoce en profundidad el papel que juegan los factores psicológicos en el éxito del emprendedor (Baum, Frese y Baron, 2007). Una de las principales motivaciones que guían la investigación sobre el espíritu emprendedor es la posibilidad de saber cómo y por qué algunas personas, y no otras, reconocen y aprovechan oportunidades que permiten desarrollar nuevos proyectos rápidamente y con éxito (Baron, 2002). Una de las razones fundamentales por las que aún no se ha podido responder de forma clara y con datos que lo apoyen a esta cuestión es la falta de instrumentos de medida que evalúen de forma rigurosa los aspectos involucrados en el espíritu emprendedor. Como se expondrá a lo largo de esta introducción, las

perspectivas económicas y sociológicas han jugado un papel fundamental en el desarrollo teórico del proceso emprendedor, mientras que la Psicología es quien ha tomado las riendas en los últimos años destacando por su aportación en la evaluación de la conducta emprendedora.

La medición en el ámbito de la Psicología ha experimentado cambios espectaculares en los últimos años, tanto desde un punto de vista básico y técnico como desde una perspectiva aplicada. Estos grandes cambios se han producido gracias a la convergencia de dos factores generales, por un lado, a) los avances psicométricos en los modelos de medida como por ejemplo los desarrollados desde el marco teórico de la Teoría de Respuesta a los Ítems (TRI) y los modelos de Ecuaciones Estructurales (SEM; *Structural Equation Modeling*), los cuales permiten análisis más precisos de las propiedades psicométricas de los tests (De Ayala, 2009; Muthén y Muthén, 2012; Wilson, 2005); y por otro, b) los avances informáticos, imprescindibles para una utilización operativa de estos modelos (Cai, 2013; Muthén y Muthén, 2012). Esta conjunción ha abierto un escenario nuevo en la evaluación psicológica, abriendo nuevas perspectivas y planteando nuevos retos, tanto desde una perspectiva básica como aplicada y profesional. En este contexto, la finalidad de esta Tesis Doctoral es identificar los principales rasgos de la personalidad emprendedora y desarrollar un instrumento válido y fiable para la evaluación de la personalidad emprendedora en jóvenes. Hasta la fecha no existe en España una batería de pruebas que permita evaluar de forma válida y fiable todos los rasgos de la personalidad emprendedora en jóvenes.

1.1. Los orígenes del espíritu emprendedor

El concepto de emprendedor se utilizaba en el siglo XVII para referirse al guerrero que decidía iniciar una conquista, evocando el espíritu de las cruzadas de la Edad Media y resaltando así la necesidad de arrojo, valentía y riesgo que requería la

iniciativa (Vérin, 1982). Cantillon incorpora un matiz económico al concepto al definir a estas personas como "aquellas que están dispuestas a comprar a un precio determinado y vender a un precio indeterminado" (Blaug, 2000, p. 379). Este sería un buen ejemplo de cómo algunas de estas características personales permanecen impermeables al paso del tiempo siendo un argumento totalmente aplicable en la sociedad actual. En 1898, Weber sugirió que ser emprendedor significa asumir riesgos en aras de obtener un beneficio por la organización de alguna parte de la economía en la que las necesidades de la gente son satisfechas a través del intercambio (Swedberg, 2000). Estas definiciones podrían considerarse el germen que dio lugar a la posterior consolidación del emprendedor como responsable del cambio.

Los inicios del siglo veinte constituyeron uno de los períodos con más cambios tecnológicos de la historia de la humanidad, y autores clásicos en el ámbito de la economía como Schumpeter (1911), Taussig (1915) o Knight (1921) analizaron el papel de las personas en estos cambios. En este contexto de desarrollo económico surge por primera vez el concepto de *entrepreneurship* para definir al individuo capaz de cambiar la dirección de la sociedad gracias a su capacidad para identificar, innovar y hacer operativo el mercado (Baum, Frese, Baron, & Katz, 2007). Desde este momento el emprendedor se convierte en responsable del cambio, tanto personal como social, característica que permanecerá constante hasta la actualidad.

En este contexto, resulta relevante distinguir conceptos que se suelen utilizar de forma intercambiable pero que aportan matices interesantes: *entrepreneur, entrepreneurship, enterprising y entrepreneurial.* El término *entrepreneur* viene del francés y significa empresario. Viendo los antecedentes históricos del término no resulta raro que sirva de raíz para el resto de expresiones ya que casi desde su origen más remoto ha estado asociado a la obtención de beneficios (Chell, 2008). El término

entrepreneurial es un adjetivo que también se refiere directamente a la empresa y se podría traducir como empresarial (Locke y Baum, 2007). Sin embargo, como se verá a continuación, no siempre la connotación económica es inherente al término. *Entrepreneurship* ha sido adaptado al español como espíritu emprendedor para describir las características individuales, económicas y sociales involucradas en el desarrollo de proyectos ya sean de tipo personal, social o económico (Baum, Frese, Baron y Katz, 2007; Dees, Emerson y Economy, 2001; Hisrich, 2015). *Enterprising* es un adjetivo que se utiliza para describir al emprendedor. Este término es habitualmente utilizado como la antesala del empresario. Conviene tener en cuenta que no necesariamente un joven emprendedor comenzará una aventura empresarial. Es decir, se asume que todos los empresarios fueron en algún momento emprendedores pero no todos los emprendedores serán necesariamente empresarios (Dees et al., 2001). En los siguientes capítulos de desarrollará la idea subyacente a esta asunción y se mostrarán los diferentes caminos asociados a un emprendedor.

Las primeras definiciones del espíritu emprendedor reflejan la falta de fundamentos teóricos e investigaciones sólidas que permitan un profundo entendimiento tanto del concepto como de sus implicaciones (Chell, 2008). Por ejemplo, hasta la fecha no existe una definición unificada y la mayoría de teóricos no parecen lograr un acuerdo entre sus definiciones: a) "El espíritu emprendedor es un proceso mediante el cual los individuos – ya sea por su cuenta o dentro de organizaciones – persiguen oportunidades sin tener en cuenta los recursos disponibles" (Stevenson y Jarillo, 1990, p. 23); b) El espíritu emprendedor es la capacidad de reconocer oportunidades y al mismo tiempo averiguar si existen posibilidades de aprovechar los recursos necesarios para explotarlas (Kwiatkowski, 2004); c) "El espíritu emprendedor es un proceso de reconocimiento y búsqueda de oportunidades con fines creativos teniendo en cuenta todos los recursos

disponibles en ese momento" (Chell, 2007, p. 18); d) "El espíritu emprendedor es un proceso que envuelve el descubrimiento, evaluación y explotación de oportunidades que permitan introducir nuevos productos, servicios, procesos, formas de organización o mercados en la sociedad" (Shane y Venkataraman, 2000, p. 218); e) "El espíritu emprendedor es un proceso que envuelve el descubrimiento, evaluación y explotación de los bienes y servicios futuros mediante la creación o identificación de nuevos fines y medios no detectados o no utilizados previamente en el mercado" (Eckhardt y Shane, 2003, p. 336).

Las definiciones propuestas hasta la fecha ayudan a pensar sobre el significado del espíritu emprendedor, sin embargo, no proporcionan los límites suficientes para poder identificar quién es emprendedor (Baum, Frese, Baron, y Katz, 2007). Por lo tanto, se podría considerar que la naturaleza del espíritu emprendedor es demasiado compleja para ser definida en detalle sin caer en reduccionismos que excluyan a parte de la población o generalidades que incluyan a todos. Por ejemplo, cuando las definiciones se refieren a los recursos no deberían hacerlo exclusivamente en términos económicos sino que también deberían incluir el capital humano y social (Chell, 2008). De hecho, algunos autores argumentan que la mayor aportación de la investigación sobre el espíritu emprendedor se encuentra en la búsqueda de características personales que aumenten la probabilidad de éxito de la puesta en marcha de nuevos negocios (Rauch y Frese, 2007a, b). Por otro lado, definiciones como las de Eckhardt y Shane (2003) o la de Shane y Venkataraman (2000) estarían condicionando el espíritu emprendedor a la aportación de algo novedoso y creativo. Sin embargo, esta definición, aunque relevante en el campo de las nuevas tecnologías, estaría excluyendo a un importante número de casos como las empresas familiares o los pequeños negocios (Brandstätter, 2011). De igual modo, delimitar el espíritu emprendedor a la fundación de nuevos negocios sería

también altamente excluyente al dejar fuera, por ejemplo, organizaciones sociales o comunitarias y emprendedores corporativos (Chell, 2008).

Como ya se había sugerido anteriormente, se puede distinguir entre espíritu emprendedor y empresarial, éste último se circunscribe al ámbito exclusivo de la empresa como una manifestación concreta, de las tantas posibles, del espíritu emprendedor. Es posible identificar al menos tres tipos de emprendedores en función de los objetivos que pretenden alcanzar: extra-emprendedor, intra-emprendedor y emprendedor personal. El extra-emprendedor es aquella persona cuya meta es el desarrollo de nuevos proyectos externos ligados a la creación empresarial (Rauch y Frese, 2007b). El intra-emprendedor es aquella persona que se responsabiliza de crear innovación dentro de una empresa mejorando proyectos que ya están en marcha (Lumpkin, 2007; Pinchot, 1984). El emprendedor personal se caracteriza por tener un alto control e iniciativa personal capaz de manejar situaciones difíciles, por ejemplo, con estresores, desempleo o cambios en la carrera profesional (Frese y Fay, 2001). Un caso particular serían los emprendedores sociales, se diferencian de los empresarios principalmente en que su principal objetivo está orientado a fines sociales como el trabajo en organizaciones no gubernamentales o el investigador que propone una teoría o técnica no explorada hasta ese momento (Dees et al., 2001).

En función de la revisión realizada se propone una nueva definición que guiará el desarrollo de esta Tesis Doctoral y que está inspirada en los puntos esenciales de las definiciones existentes: *El espíritu emprendedor es un proceso multidimensional que determina el desarrollo personal orientado hacia la propuesta, resolución y mantenimiento de nuevos proyectos, ya sean éstos de carácter económico, personal o social*. Además, tal y como se desarrollará a lo largo de esta Tesis Doctoral, existen múltiples evidencias de que el espíritu emprendedor puede ser mejorado mediante la

educación y formación adecuada (Chandler, DeTienne, McKelvie, y Mumford, 2011; Katz, 2007; Peterman y Kennedy, 2003; Souitaris, Zerbinati, y Al-Laham, 2007). Este hecho convierte a los jóvenes en una población especialmente interesante ya que permitiría potenciar su formación en edades tempranas y facilitar su orientación profesional (Bonnett y Furnham, 1991; Burges Sbicigo y Dell´Anglio, 2013; Schmitt-Rodermund, 2004). Por tanto, parece lógico pensar que el espíritu emprendedor puede ser desarrollado en la medida en que se identifiquen y se evalúen las variables que influyen en dicho proceso (Muñiz, Suárez-Álvarez, Pedrosa, Fonseca-Pedrero, y García-Cueto, 2014; Suárez-Álvarez, Pedrosa, García-Cueto, y Muñiz, 2014). La cuestión entonces sería identificar qué variables hacen que alguien participe en dicho proceso. Principalmente, se han utilizado tres enfoques para responder a esta cuestión: Económico, sociológico, y psicológico.

1.2. Enfoques socioeconómicos sobre el espíritu emprendedor

Las raíces de las teorías del espíritu emprendedor surgen fundamentalmente desde una perspectiva económica (Casson, 1982; Knight, 1921; Penrose, 1959; Taussig, 1915; Schumpeter, 1911; Witt, 1998, 1999). En esencia, los economistas tienden a desarrollar teorías sobre las decisiones que son relevantes para el aprovechamiento de recursos con la finalidad de obtener resultados económicos, tales como el rendimiento de las empresas, las industrias y los países. Así por ejemplo, tal y como se muestra en la Tabla 1, uno de los objetivos de estas teorías sería garantizar que la oferta de un producto o servicio responda a la demanda. Este tipo de aproximaciones pueden resultar especialmente útiles para establecer políticas empresariales, de mercado o incluso para que los países impulsen determinados proyectos económicos en función de la oferta y la demanda. Sin embargo, los economistas no suelen estar suficientemente interesados en la personalidad o los aspectos psicológicos del espíritu emprendedor, aunque muchos de

ellos hacen alusión a la personalidad en sus teorías e incluso llegan a asumir la influencia de determinadas cualidades personales (Schumpeter, 1911; Casson, 1982; Kirzner, 1982). En otras palabras, esta perspectiva se centra principalmente en el papel que los emprendedor pueden llegar a jugar en la economía (Chell, 2008). Por tanto, este tipo de teorías tienden a situar a la persona en un segundo plano ya que no ponen suficiente énfasis en las conductas individuales de los emprendedores.

En las últimas décadas surgen diferentes aproximaciones que intentan aportar una visión más completa de los aspectos involucrados en el proceso del espíritu emprendedor desde una perspectiva sociológica (Chell, 2008). Así por ejemplo, el enfoque del construccionismo social busca entender desde un punto de vista holístico cómo las personas actúan en determinadas circunstancias y recogen ideas sobre su comportamiento (Tabla 1). Esta teoría asume que las conductas de las personas están interconectadas entre ellas a través de una estructura socialmente construida de normas sociales, reglas y responsabilidades que a su vez están limitadas por sistemas de regulación económicos, políticos y legales (Chell, 2008). Tal y como expone Chell (2008) en su libro *The Entrepeneurial Personality: A social construction*, el construccionismo social enfatiza lo subjetivo y parte del axioma de que una persona nunca puede llegar a experimentar las mismas sensaciones o pensamientos que otra persona. Este enfoque contrasta de forma sustancial con la perspectiva económica y, especialmente, con la psicología de los rasgos. Más adelante se destinará un apartado específicamente a explicar la aportación de la Psicología al estudio el espíritu emprendedor. Si bien la Tabla 1 puede servir como una primera aproximación para entender las principales diferencias entre los enfoques del estudio del espíritu emprendedor.

Tabla 1.

Comparación de los enfoques del estudio del espíritu emprendedor (Chell, 2008, p. 6)

Económico	Sociológico	Psicológico
La teoría del equilibrio asume un modelo de comportamiento económico en el que se toman decisiones para asignar recursos de manera que se garantice que la oferta de un producto o servicio cumple con la demanda. Cuando se asume información perfecta, el empresario no tiene ninguna función que realizar. La distribución imperfecta de información permite al individuo utilizar esa información para aprovechar una oportunidad que los demás desconocen. *La teoría de la información radical*, sin embargo, supone la creación de un nuevo producto o servicio que crea desequilibrio.	*La teoría de la estructuración* asume que el comportamiento está influido (o determinado) a través de las reglas sociales, normas y responsabilidades, dando sentido, legitimidad y poder a la persona. Sin embargo, este comportamiento se ve limitado en cada nivel del sistema socioeconómico a través de reglas y regulaciones económicas, políticas y jurídicas. El empresario debe trabajar dentro de este sistema; como tal, el comportamiento surge de una interacción entre la persona y la estructura. El constructivismo social asume que cada persona es única y que se debería utilizar una visión holística de la conducta y el contexto. Los construccionistas sociales critican el positivismo y la teoría de los rasgos como "esencialista".	*La psicología de los rasgos* supone que hay una estructura "interna" de la personalidad. Esta estructura puede reducirse en cinco grandes rasgos. La mezcla y la fuerza de estos rasgos determinan la personalidad en general. También existen rasgos específicos que miden atributos particulares de la persona. En este nivel, se han hecho intentos para identificar los rasgos que caracterizan al emprendedor. La psicología de los rasgos asume que un rasgo es una característica relativamente estable y duradera que influirá fuertemente en el comportamiento. Por lo tanto, debería ser posible, si se identifica el rasgo correcto, predecir el comportamiento de una muestra de empresarios. La psicología de los rasgos no puede predecir el comportamiento en casos particulares, pero puede predecir la probabilidad de un comportamiento dado el rasgo. Las alternativas a los rasgos son las construcciones personales, habilidades, estrategias y planes.

1.2.1. La perspectiva económica

Las teorías económicas del emprendedor más influyentes tienen sus raíces en Europa, especialmente en Francia, Reino Unido y Austria. Richard Cantillon, irlandés

de origen que desarrolló su carrera profesional en Francia, es considerado uno de los primeros grandes teóricos de la economía y fue probablemente el primero en reconocer el papel del empresario en la economía (Chell, 2008). Cantillon (1756) postula que el resultado de toda actividad es incierto, implica un riesgo y alguien (i.e. *entrepreneur*) tiene que asumirlo con la esperanza de obtener una recompensa en el futuro. Dentro de lo que se denominó "*la escuela francesa"* y de la cual Cantillon fue precursor, Jean-Baptiste Say (1803) desarrolló el concepto de emprendedor como intermediario entre el capital y el trabajo. Esto permitiría entender al emprendedor como el catalizador para el desarrollo de productos en el mercado.

Posteriormente, "*la escuela británica",* liderada por influyentes figuras como Adam Smith, John Stuart Mill y Aldred Marshall, enfatizan el papel del empresario en la economía y reconocen la innovación como un sello de identidad de los emprendedores (Herbert y Link, 1988). La teoría del empresario de Marshall (1890) pone su énfasis en la capacidad de liderazgo y organización creativa de los recursos (i.e. tierra, trabajo y capital). Además, por primera vez hasta el momento, se considera que las habilidades para ser emprendedor pueden ser adquiridas (Marshall, 1890), aspecto que resulta especialmente relevante en el marco de esta Tesis Doctoral.

El paso hacia el siglo XX fue liderado en gran medida por la "*escuela austriaca"* gracias a las influyentes teorías de personajes como Joseph Alois Schumpeter e Israel Kirnzer. Esta corriente enfatiza el papel que juega emprendedores y empresarios en la estabilidad de los mercados de bienes y servicios. Schumpeter (1911) identifica la innovación como uno de los elementos fundamentales de un sistema económico, de la cual el emprendedor debe ser su líder. Por otro lado, Kirzner (1973) subraya que la principal característica del emprendedor es su capacidad para identificar oportunidades en el mercado. En este sentido, se entiende que la estabilidad del

mercado depende de cómo se distribuya la información acerca de los recursos (i.e. oportunidades de negocio). Las teorías más modernas añaden además el importante papel que juegan la percepción (subjetiva) de oportunidades de negocio y la capacidad personal de explotarlas (Felzensztein, Gimmon y Aqueveque, 2013; Stewart, May y Kalia, 2008).

En suma, este tipo de teorías tienden a otorgar más peso a variables económicas como los recursos, el capital, la información, o las oportunidades de negocio que a variables de tipo personal. No obstante, ya desde sus orígenes todas las teorías económicas tienden a incorporar aspectos personales como la innovación o el liderazgo (Marshall, 1890), asumir que las características personales del emprendedor pueden ser adquiridas (Schumpeter, 1911), y en definitiva, aceptar el carácter subjetivo e individual del espíritu emprendedor (Felzensztein, Gimmon y Aqueveque, 2013; Stewart, May y Kalia, 2008). Para una revisión más exhaustiva de las principales aportaciones de la perspectiva económica véase Chell (2008, p. 17-50).

1.2.2. La perspectiva sociológica

Los factores culturales, sociales y políticos condicionan en gran medida las oportunidades y amenazas percibidas por el emprendedor (Bloodgood, Sapienza y Carsrud, 1995). La teoría de la estructuración asume que el emprendedor está condicionado o influenciado por diferentes niveles o estructuras sociales (Chell. 2008). El primer nivel estructural sería el *micro* y corresponde al entorno personal, toma de decisiones y conductas individuales. El nivel intermedio *meso* sería por ejemplo el entorno empresarial, organizacional o universitario encargado de establecer límites mediante normas y políticas. El tercer y último nivel sería el *macro* y estaría compuesto por las leyes, normas y regulaciones establecidas por la cultura, el país o la región.

En relación al contexto más cercano a la persona, los antecedentes familiares y la educación son dos de los aspectos clave en el desarrollo del espíritu emprendedor. Recientes investigaciones han mostrado que desarrollarse en un entorno emprendedor tiene una influencia positiva y facilitadora de la conducta emprendedora (Aboal y Veneri, 2014; Altinay, Madanoglu, Daniele y Lashley, 2012; Geldhof, Weiner, Agans, Mueller y Lerner, 2014). Además, también existe evidencia de que el entorno familiar influye significativamente en las intenciones de elección de carrera en la etapa adolescente (Schroder, Schmitt-Rodermund y Arnaud, 2011). Por otro lado, la posibilidad de una formación adecuada al objetivo de emprender convierte a la adolescencia en una etapa especialmente interesante (Unger, Rauch, Frese y Rosenbusch, 2011; Veciana, Aponte y Urbano, 2005). La principal razón es que estudiantes potencialmente emprendedores que asistan a cursos de formación específica incrementarían sus competencias, conocimientos y habilidades para aprovechar adecuadamente las oportunidades que se les presenten respecto a los que no reciben ese tipo de formación (Kolstad y Wiig, 2013; Volery, Muller, Oser, Naepflin y del Rey, 2013).

Una de las aportaciones más interesantes de la perspectiva sociológica es el énfasis que se pone en la subjetividad. Así por ejemplo, el Modelo de la Conducta Empresarial (Shapero y Sokol, 1982) establece que la iniciativa empresarial depende de las oportunidades existentes y de la percepción de viabilidad para llevarlas al cabo. De forma similar, la Teoría del Comportamiento Planificado (Ajzen, 1991) argumenta que la intención emprendedora está determinada por la actitud, las normas sociales y la percepción de control. Desde una perspectiva más holística, el modelo de Veciana (1999) describe como factores fundamentales de la conducta emprendedora los antecedentes familiares, los atributos personales (i.e. rasgos, motivaciones y

experiencias), aspectos organizacionales (i.e. tamaño, localización, etc) y el entorno (i.e. viabilidad y disponibilidad de recursos). Nótese el matiz subjetivo que incorporan todos estos modelos respecto a los modelos económicos clásicos donde el principal énfasis se ponía más sobre la existencia de oportunidades que sobre el hecho de cómo la persona percibe la existencia de las mismas. Por supuesto, dicha subjetividad depende en gran medida de la cultura y el contexto en el que se encuentra la persona.

Las normas culturales así como las leyes y regulaciones particulares de cada país tienen una importante influencia en la percepción y la conducta de los emprendedores. Un buen ejemplo de ello se puede encontrar en los informes anuales que realiza la Organización para la Cooperación y el Desarrollo Económico (OECD, 2015) y el Observatorio Internacional del Fenómeno Emprendedor (GEM, 2015a, 2015b).

1.2.2.1. OECD: Entrepreneuship at a Glance

La Organización para la Cooperación y el Desarrollo Económico (OECD; *Organisation for Economic Co-operationand Development*) es el único foro donde los gobiernos trabajan juntos para resolver los retos económicos, sociales y ambientales de la globalización. En el ámbito educativo son mundialmente conocidos por su Programa para la Evaluación Internacional de Alumnos (PISA; *Programme for International Student Assessment*). En el 2006 la OECD inicia el Programa de Indicadores del Emprendimiento (EIP; *Entrepreneurship Indicators Programme*) y supone el primer intento de compilar y publicar datos internacionales sobre la iniciativa empresarial de las fuentes estadísticas oficiales del Gobierno. En la actualidad la organización está formada por 34 países en todo el mundo con una importante representación europea entre la que se encuentra España.

Los resultados del último informe *Entrepreneuship at a Glance* (OECD, 2015) muestran que entender la motivación empresarial proporciona importantes conocimientos sobre el desarrollo de las políticas de apoyo al espíritu emprendedor. En especial, se resalta la importancia de diferenciar entre la oportunidad empresarial y la necesidad empresarial. En 2012, la mitad de los países de la OECD que persiguen una oportunidad de negocio o hacerse cargo de un negocio familiar explicaron alrededor del 70% de las empresas de nueva creación. Por otro lado, la necesidad fue un importante motor en las economías emergentes como es el caso de China e India, pero también en Corea, Estonia, Grecia y España, lo que parcialmente refleja la crisis económica. De hecho, en el año 2013, el 29,8% de los emprendedores españoles que inició una empresa declaró hacerlo tras considerar que constituía su única opción profesional (GEM, 2015).

En resumen, la combinación de oportunidades, capacidades y recursos no necesariamente conduce a la actividad emprendedora si los costes de oportunidad (e.g. perdida de salario o empeoramiento de la cobertura sanitaria) y los costes iniciales son mayores que los beneficios potenciales. Por lo tanto, el marco regulatorio, los impuestos y regulaciones se convierten en un factor crítico que afecta al rendimiento empresarial de los países (OECD, 2015).

1.2.2.2. Proyecto GEM: Global Entrepreneurship Monitor

El *Global Entrepreneurship Monitor* es un proyecto reconocido a nivel mundial con más de 1,3 millones de datos recogidos principalmente de población activa (adultos entre 18 y 64 años) de 85 países diferentes (GEM, 2015). En la Figura 1 se presenta de forma detallada cual es el marco conceptual del proyecto, el cual abarca fundamentalmente tres áreas clásicas del estudio económico y social: a) Valores, percepciones y aptitudes emprendedoras; b) La actividad emprendedora y sus características; c) El contexto en el que se desarrolla el proceso emprendedor. La

principal finalidad del proyecto GEM es proporcionar una herramienta integral de información relacionada con el emprendimiento. El progreso de la investigación del fenómeno emprendedor aporta cada año nuevos detalles que se van incorporando al esquema (GEM, 2015).

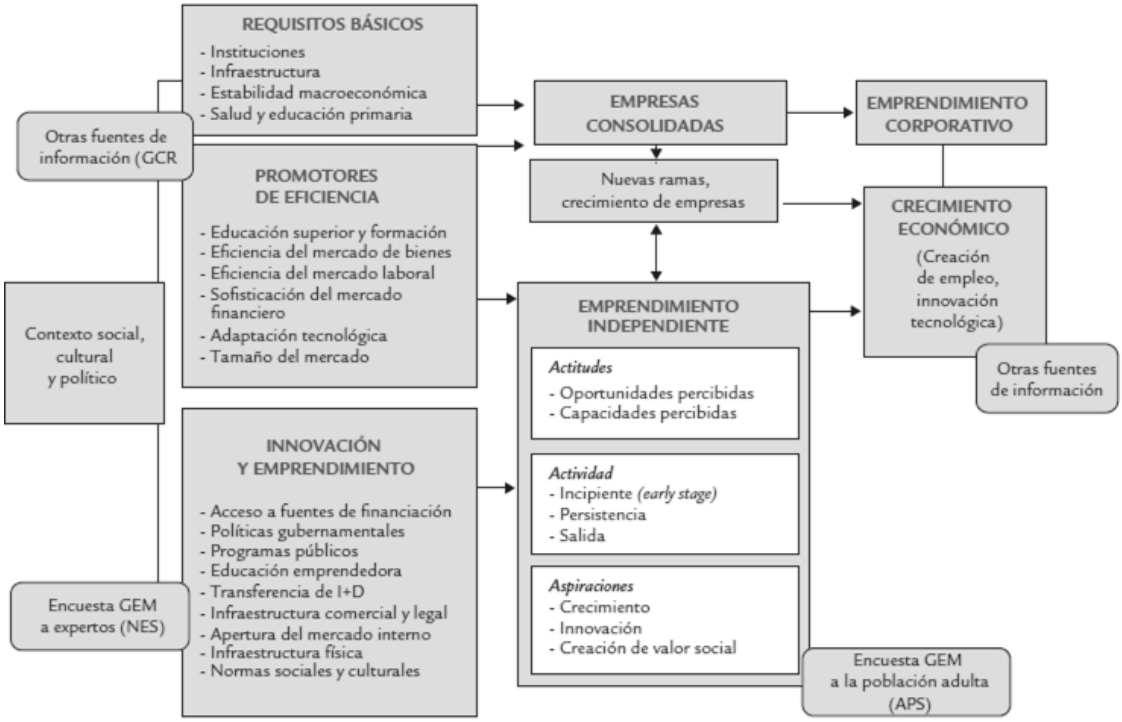

Figura 1. Marco teórico proyecto GEM (GEM, 2015, p.28)

Tal y como se muestra en la Figura 2, GEM entiende el emprendimiento como un proceso que se inicia con la generación de una idea, continua con las acciones de su puesta en marcha, se lanza al mercado, entra en una fase de consolidación y finalmente pasa a la fase consolidada cuando sobrevive durante más de tres años y medio (GEM, 2015, p. 29). Siguiendo el diagrama propuesto, se podría entender que la mayor contribución de esta Tesis Doctoral se hace sobre el *emprendimiento potencial.* La idea que guía esta Tesis Doctoral es que la identificación de los rasgos del emprendedor permitirá evaluar y moldear la conducta futura hacia los resultados deseados (Muñiz et al., 2014; Suárez-Álvarez, Pedrosa et al., 2014).

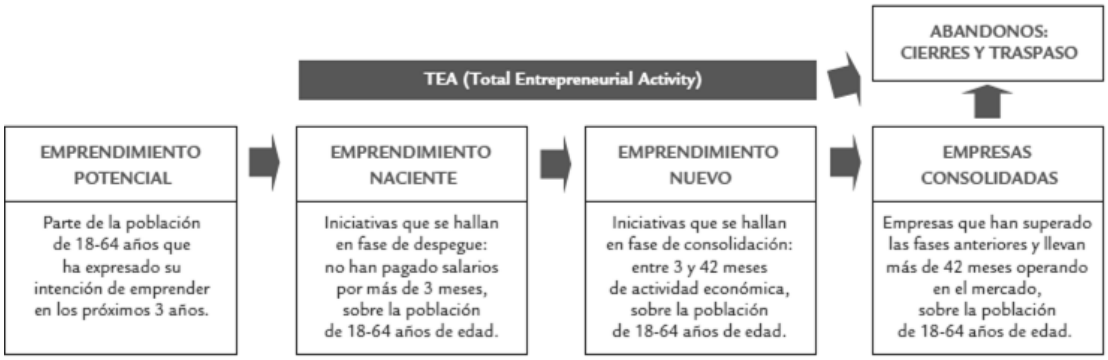

Figura 2. El proceso emprendedor según el proyecto GEM (GEM, 2015, p. 29)

Según el último Informe GEM España (GEM, 2015), aproximadamente seis de cada diez emprendedores eran hombres; sin embargo, la diferencia entre hombres y mujeres a la hora de emprender ha disminuido en los dos últimos años. El 47,6% de los emprendedores tenía algún tipo de formación superior o de post-grado, y el 43,5% había recibido en algún momento de su vida formación específica para emprender. Por otro lado, el 18,2% de emprendedores potenciales (i.e. intención de crear una empresa en menos de tres años) tienen edades comprendidas entre los 18 y 24 años. El 56,6% de los emprendedores potenciales declara no tener formación específica, porcentaje que asciende a 63,6% en el caso de quienes abandonan la actividad empresarial. Estas circunstancias invitan a pensar que una formación específica orientada a emprender serviría de andamiaje que facilite tanto el desarrollo como la consolidación de nuevos proyectos (Kolstad y Wiig, 2013; Volery, Muller, Oser, Naepflin y del Rey, 2013).

España se caracteriza por tener una percepción de oportunidades inferior a la media de los países europeos. Sin embargo, resulta curioso que la percepción de conocimientos y habilidades para emprender se sitúa por encima de la media europea. Estos resultados sugieren que variables como el autoconcepto, la motivación y las expectativas puedan jugar un importante papel tanto en la percepción de oportunidades como en la percepción de competencia. A este respecto, la investigación educativa ya ha dado buena cuenta del importante peso que este tipo de variables tienen, por ejemplo,

sobre el rendimiento académico (Suárez-Álvarez, Fernández-Alonso y Muñiz, 2014). En suma, estos resultados arrojan luz a algunos de los problemas con los que se encuentra en la actualidad la persona emprendedora en España y enfatizan la importancia de la Educación en el proceso del espíritu emprendedor. Sin embargo, a pesar de las múltiples aproximaciones, hasta el momento no se ha realizado una revisión exhaustiva y sistemática de las variables psicológicas que condicionan la conducta emprendedora.

1.3. La aportación de la Psicología al estudio del espíritu emprendedor

Baum, Frese, and Baron (2007) argumentan en su libro titulado *The Psychology of Entrepeneurship* el papel central de la Psicología para legitimar e incluso popularizar el espíritu emprendedor. La psicología del espíritu emprendedor se centra fundamentalmente en la identificación y medición de determinados rasgos que se asumen inherentes a la persona y que, identificado el rasgo correcto, permitiría estimar la probabilidad de que determinadas conductas sucedan en el futuro (Baum, Frese, Baron y Katz, 2007; Chell, 2008). Este argumento gana solidez al tener en cuenta que ya desde sus inicios el concepto de emprendedor estuvo ligado a la persona e incluso teorías clásicas de economía ya incluían variables personales. Por ejemplo, Schumpeter (1911) incorporó conceptos similares a la innovación, la orientación hacia los resultados, la dominancia y otros factores de personalidad en sus teorías de desarrollo económico. Por tanto, parece razonable pensar que una ciencia centrada en el estudio de la conducta y el comportamiento individual tendrá mucho que aportar al campo de investigación del espíritu emprendedor. Más concretamente, Katz (2007, p. 229) concluye que: "Probablemente la contribución más importante es la tendencia de la disciplina psicológica hacia la construcción de teorías y tests. Los psicólogos típicamente tienen más formación en desarrollo de teorías que la que ofrecen las

escuelas de negocios. Segundo, los psicólogos proporcionan un conjunto de técnicas y teorías que son novedosas y distintivas. Estas van desde los tests de personalidad hasta métodos de investigación". Desde un punto de vista metodológico, una importante contribución de esta Tesis Doctoral al estudio del espíritu emprendedor es la utilización de avanzados modelos de Teoría de Respuesta a los Ítems (IRT; *Item Response Theory*) y modelos de Ecuaciones Estructurales (SEM; *Structural Equation Modeling)*, los cuales permiten análisis más precisos de las propiedades psicométricas de los tests (De Ayala, 2009; Muthén y Muthén, 2012; Wilson, 2005).

La investigación realizada hasta la fecha ha mostrado que la conducta emprendedora está influenciada por múltiples factores entre los que destacan los aspectos económicos, los sociales y los personales (Chell, 2008; Rauch y Frese, 2007a). En función de estos resultados se podría considerar que la conducta emprendedora es multidimensional. Por tanto, desarrollar modelos y explicaciones integrales que reflejen de forma realista el espíritu emprendedor requiere tener en cuenta diferentes dimensiones de forma conjunta. En la Figura 3 se propone un modelo integral del espíritu emprendedor que recoge la esencia de los principales modelos desarrollados hasta la fecha (Rauch y Frese, 2000; Rauch y Frese, 2007a; Sánchez, 2011a) e incorpora los últimos hallazgos encontrados en la investigación de la personalidad emprendedora. Se trata de un modelo comprensivo en el que se representan los principales aspectos involucrados en la actividad emprendedora. El modelo integral del espíritu emprendedor (Figura 3) puede servir como un esquema preliminar sobre el que articular futuras investigaciones. Si bien el modelo resulta plausible en la medida en que cada uno de los aspectos por separado ha demostrado estar conectados con la actividad emprendedora, se requiere más investigación que permita relacionar las variables en su conjunto.

Figura 3. Modelo integral del espíritu emprendedor adaptado de Rauch y Frese (2007a)

El modelo presta especial atención a las dimensiones que componen la zona de desarrollo personal, la cual está influenciada por las variables que conforman el contexto socioeconómico, tales como la educación, la familia, la cultura y el sistema de normas, leyes y regulaciones de los países (GEM, 2015; OCDE, 2015). Dentro de la zona de desarrollo personal, merecen especial atención los trabajos centrados en la Inteligencia Emocional (Ahmetoglu, Leutner, y Chamorro-Premuzic, 2011), debido a la relación que ésta presenta con aspectos como la innovación (Suliman y Al-Shaikh, 2007) o la motivación de logro y la autoeficacia (Muñiz et al., 2014). Otra de las partes fundamentales de dicho modelo corresponde a los aspectos cognitivos, donde se incluyen constructos como los estilos cognitivos (Sánchez, Carballo y Gutiérrez, 2011), la creatividad (Ward, 2004) y la inteligencia (Newton y McGrew, 2010). El estudio de la personalidad ha cobrado especial fuerza en los últimos años, pudiendo distinguirse dos enfoques principales: investigadores que prefieren utilizar rasgos generales de personalidad, como los Big Five (Brandstätter, 2011; Zhao, Seibert y Lumpkin., 2010);

y quienes proponen utilizar rasgos más específicos y cercanos a la actividad emprendedora (Rauch y Frese, 2007a, 2007b; Suárez-Álvarez, Pedrosa, García-Cueto y Muñiz, 2014).

Los partidarios de utilizar rasgos generales de personalidad argumentan que estos factores (extraversión, estabilidad emocional, responsabilidad, amabilidad y apertura a la experiencia), explican alrededor del 13% de la varianza de la actividad emprendedora y alrededor del 10% del éxito empresarial (Zhao et al., 2010), y correlacionan con la actividad de los empresarios y *managers* (Brandstätter, 2011). Concretamente, las dimensiones de responsabilidad y apertura a la experiencia son las que presentan una mayor relación tanto con la conducta emprendedora como con el rendimiento empresarial (Zhao et al., 2010). Dentro de esta corriente, aunque de una forma mucho menos representativa, también se utilizan los factores de personalidad evaluados por el Eysenck Personality Questionnaire Revisado (Furnham, 2002) y los 16 factores de la personalidad de Cattell (Chell, 2008).

Los rasgos específicos de personalidad que parecen estar más relacionados con la personalidad emprendedora serían: motivación de logro, autoeficacia, toma de riesgos, innovación, autonomía, tolerancia al estrés, locus de control interno y optimismo (Rauch y Frese, 2007a, 2007b; Muñiz et al., 2014; Suárez-Álvarez, Pedrosa et al., 2014; Zhao et al., 2010). El argumento central que apoya la utilización de modelos de rasgos específicos de personalidad en lugar de rasgos generales, es que los rasgos específicos serían capaces de explicar aspectos más concretos de la personalidad emprendedora (Laguna, 2013; Lanero, Vázquez y Muñoz-Adánez, 2015; Tyszka, Cieslik, Domurat y Macko, 2011), por lo que las predicciones hechas a partir de ellos resultarían más precisas. Se trata de una hipótesis plausible, sobre la cual se están empezando a recoger los primeros datos consistentes, hallando relaciones moderadas

respecto a la creación y el éxito empresarial (Rauch y Frese, 2007a, 2007b). De hecho, en la actualidad existen resultados que sugieren que los rasgos más específicos de la personalidad emprendedora añaden validez predictiva del éxito empresarial con respecto a los Big Five de la personalidad (Leutner, Ahmetoglu, Akhtar y Chamorro-Premuzic, 2014). En otras palabras, la inclusión de ambas medidas a lo largo del proceso de evaluación mejoraría la toma de decisiones y el poder predictivo. Por esta razón, el modelo presentado en la Figura 3 contempla de forma interactiva ambos modelos de la personalidad emprendedora.

1.3.1. Rasgos específicos de la personalidad emprendedora

El estudio de todo lo relativo a la personalidad emprendedora ha crecido exponencialmente en los últimos años llegándose a proponer múltiples rasgos de personalidad que intentan representar de forma exhaustiva el proceso del espíritu emprendedor. Dichos rasgos son los que componen la parte central del modelo propuesto (Figura 3) y la piedra angular de esta Tesis Doctoral. En la Tabla 2 se propone una definición operativa y concisa de cada uno de los rasgos fundamentales de la personalidad emprendedora con la intención de sintetizar la esencia de las definiciones ya existentes. En los siguientes apartados se profundizará en cada una de las dimensiones presentando las principales fuentes que dieron lugar a esas definiciones así como los principales problemas encontrados en cuanto a su medición.

Tabla 2.
Definición operativa de los rasgos de la personalidad emprendedora

Rasgo	Definición
Motivación de logro	Deseo de alcanzar estándares de excelencia, es decir, la consecución y mejora de objetivos.
Toma de riesgos	Tendencia a asumir ciertos niveles de inseguridad que permitan alcanzar una meta que presente mayores beneficios que las posibles consecuencias negativas.
Innovación	Voluntad e interés en la búsqueda de nuevas formas de hacer las cosas.
Autonomía	Motivación hacia la creación de proyectos como un intento de lograr cierta libertad individual.
Locus de control Interno	Atribución causal de que las consecuencias de una conducta dependen de uno mismo.
Autoeficacia	Convicción de que uno puede organizar y ejecutar eficazmente acciones, así como persistir, hasta conseguir los resultados deseados.
Tolerancia al estrés	Resistencia a percibir los estímulos ambientales como estresantes gracias al uso adecuado de estrategias de afrontamiento.
Optimismo	Tendencia a creer que en la vida suceden más eventos positivos que negativos.

1.3.1.1. Motivación de logro

En algunas ocasiones el concepto de motivación de logro se intercambia por el de necesidad de logro, lo que en cualquier caso se refiere, de forma general, a emprender una conducta orientada al cumplimiento de unos objetivos, un concepto que se atribuye originariamente a la Teoría de las Necesidades de McClelland (1955, 1961). Según esta teoría, quien tiene alta necesidad de logro participa en actividades energéticas e innovadoras que requieren planificación de futuro y responsabilidad individual. En otras palabras, este tipo de personas prefieren tareas que conlleven habilidad y esfuerzo y, en cierta medida, supongan un desafío y riesgo moderado (McClelland, 1955, 1961; McClelland, Atkinson, Clark y Lowell, 1953).

Algunos autores han enfatizado la falta de una teoría general unificada (Manassero y Vázquez, 1998) que permita integrar los diversos modelos teóricos, así como el escaso esfuerzo por conseguir una definición operativa del constructo (Schunk, 2000). Sin embargo, diferentes autores se han puesto de acuerdo en el hecho de que la

motivación de logro puede ser entendida como una tendencia individual de voluntad y trabajo hacia el logro de metas personales y profesionales (Byrne et al., 2004). Así, desde la perspectiva de Baum et al. (2007), la motivación de logro es el deseo de alcanzar estándares de excelencia, es decir, de conseguir y mejorar objetivos. Esto cobra vital importancia en el contexto empresarial, donde la conducta emprendedora es evaluada en términos de eficacia, es decir, si se cumplen o no los objetivos marcados (i.e. creación y/o éxito empresarial). Además éste es uno de los rasgos específicos de personalidad incluido en el modelo de Rauch y Frese (2007, p. 47) como predictor del éxito empresarial.

Por otro lado, Carraher, Buchanan y Puia (2010) desarrollan una definición de necesidad de logro en términos de predisposición hacia posiciones emprendedoras con el fin de obtener una mayor satisfacción de logro respecto a otras posiciones menos favorecedoras. Además, estos autores advierten que este tipo de conductas parece conllevar ciertas expectativas de superación personal o percepción de competencia hacia determinadas tareas. En cualquier caso, independientemente del objetivo central perseguido por la persona, diferentes autores están de acuerdo en que este rasgo de personalidad está directamente asociado con la conducta emprendedora (Collins, Hanges y Locke, 2004; Tyszka, Cieslik, Domurat y Macko, 2011).

En lo que respecta a la medición de esta dimensión, existen dos tendencias principales para definir de forma operativa el constructo. Por un lado, se encuentra la distinción entre motivación de logro implícita y explícita (Atkinson y Feather, 1966; Bandura, 1986; Eccles, Adler, Futterman, Goff, Kaczala, y Meece, 1983; McClelland, Koestner, y Weinberger, 1989; Weiner, 1985; Wigfield y Eccles, 2000). El problema que establece esta diferenciación es que resulta especialmente complicado evaluar la motivación implícita, puesto que se encuentra contaminada por aspectos como la

inteligencia y las capacidades personales. De hecho, los trabajos que se han centrado en la elaboración de escalas para evaluar esta dimensión, no han conseguido un único factor claro y definido (Brunstein y Schmitt, 2004). Además, los intentos por evaluarla sólo han sido posibles a través de tests proyectivos como, por ejemplo, el clásico *Thematic Apperception Test* (TAT; Morgan y Murray, 1935). Por otro lado, se realizan distinciones entre deseo de éxito y miedo al fracaso (Lang y Fries, 2006). Esta diferenciación resulta lógica en el sentido de que un emprendedor pueda presentar un alto deseo de éxito así como una tendencia a evitar el fracaso, lo que en ambos casos facilita el cumplimiento de objetivos.

Dentro del contexto organizacional, algunos de los instrumentos más utilizados para su evaluación son: el *Achievement Motivation Inventory* (Byrne et al., 2004; Schuler et al., 2004; Woo, Gibbons, y Thornton III, 2007), el *Work Preference Inventory* (Amabile et al., 1994) o el *Achievement Motive Scale* (Hermans, 1970; Van den Berg y Feij, 2003). Además, destaca el *Achievement Motivation, Locus of Control and Professional Training Questionnaire* (AmLcT-Q; Suárez-Álvarez, Campillo-Álvarez, Fonseca-Pedrero, García-Cueto y Muñiz, 2013) por presentar evidencias de validez para evaluar adultos trabajadores españoles. Sin embargo, ninguno de ellos ha sido desarrollado para evaluar jóvenes emprendedores.

1.3.1.2. Toma de riesgos

La toma de riesgos se refiere a la tendencia y disposición de las personas a asumir ciertos niveles de riesgo que les permitan alcanzar una meta que presenta mayores ganancias que las posibles pérdidas (Brockhaus, 1980; Moore y Gullone, 1996). Teniendo en cuenta el modelo teórico de Baum et al. (2007), la toma de riesgos supone una de las características específicas de la personalidad emprendedora. Sin embargo, diferenciar este rasgo como independiente conlleva una importante dificultad

pues presenta una relación muy estrecha con otras variables como, por ejemplo, la motivación de logro. De hecho, es sensato pensar que cuando no se estudia como dimensión por si sola es porque de alguna forma está enmascarada en otras como la innovación o la motivación de logro. En cualquier caso, trabajos actuales ponen de manifiesto su relación con la conducta emprendedora (Rauch y Frese, 2007a; Tyszka et al., 2011; Yordanova y Alexandrova-Boshnakova, 2011).

En cuanto a su evaluación, la toma de riesgos ha sido una variable ampliamente estudiada aunque no por ello libre de problemas en su medición. El primero de ellos es que gran parte de los instrumentos creados para tal fin han sido desarrollados tomando como población diana los adolescentes y evalúan conductas de riesgo de la vida cotidiana (conducta antisocial, consumo de drogas, riesgos sexuales, apuestas, etc). Algunos ejemplos de tests de este tipo son el *CARE* (Fromme, Katz, y Rivet, 1997), *YRBS* (Centers for Disease Control and Prevention, 2003), *BRPM* (Benthin, Slovic y Severson, 1993), *MRIQ* (Siegel, Cousins, Rubovits, Parsons, Lavery y Crowley, 1994). Por otro lado, existen nuevos instrumentos de medida que sitúan a la persona en situaciones en las que debe tomar una decisión y elegir el nivel de riesgo que quiere asumir. Algunos ejemplos de estos instrumentos son el *Choice Task* (Fessler, Pillsworth y Flamson, 2004), el *Balloon Analogue Risk Task* (Lejuez, et al., 2002) o el *Risk Propensity Task* (Aguado, Rubio y Lucía, 2011). El inconveniente principal de estas pruebas es que requieren el uso de bienes materiales que sean relevantes para el participante de cara a poder estimar hasta qué punto la persona decide arriesgarse y valora, de manera sensata, el equilibrio pérdida/beneficio.

1.3.1.3. Innovación

Al igual que la motivación de logro y la toma de riesgos, la innovación es una de las variables incluidas en el modelo de la personalidad emprendedora de Rauch y

Frese (2007a). Estos autores describen como una persona innovadora a aquella con voluntad e interés en buscar nuevas formas de acción. Esto implica que un emprendedor tiende a introducir nuevos productos, servicios, procesos de producción, tecnologías e investigaciones dentro de la empresa. Sin embargo, debe tenerse en cuenta que, aunque todo ello se pueda realizar de forma individualizada, suele ser estudiado a nivel organizacional, es decir, dentro de un contexto o una empresa que lo facilite (Rauch y Frese, 2007a). En este sentido, Koellinger (2008), sugiere que la innovación empresarial depende tanto de los factores individuales como del entorno en el que se desenvuelve, llegando esto a explicar por qué algunos emprendedores son más innovadores que otros. En concreto, este autor argumenta que un nivel alto de educación, el desempleo y un alto grado de autoestima están significativamente asociados con la innovación empresarial a nivel individual. A su vez, países altamente desarrollados son significativamente más propensos a participar en proyectos innovadores que en actividades puramente imitativas. Otros autores enfatizan la diferencia entre innovación exploratoria, definida como la introducción de nuevos productos o servicios, y la explotadora, entendida como el incremento en la eficiencia de productos ya existentes (Benner y Tushman, 2003; Jansen, Van den Bosch y Volberda, 2006).

Por otro lado, el meta-análisis de Rauch y Frese (2007b) coincide con la descripción de innovación aquí aportada y concluyen que está positivamente relacionada con el éxito empresarial. Más concretamente, este rasgo de personalidad es predictor de la conducta empresarial. En definitiva, la innovación se entiende como un factor decisivo en la conducta emprendedora y, por tanto, característica fundamental de una personalidad emprendedora (Rauch y Frese, 2007a; Koellinger, 2008; Rauch y Frese; 2007a, 2007b).

La evaluación de la personalidad innovadora es un aspecto relativamente reciente y, precisamente por ello, son escasos los instrumentos encontrados a tal efecto. Además, a esto se añade el problema de que la práctica totalidad de los instrumentos encontrados están destinados a evaluar el clima de innovación empresarial, no la actitud innovadora de los trabajadores que la conforman. En este sentido, escalas como el *COIC* (Zheng, Jin y Ma, 2009) y la *IWB* (Janssen, 2000) dirigen la evaluación, bien a la línea de innovación a nivel de empresa o bien preguntando a mandos superiores qué nivel de innovación aporta un empleado en particular a la propia compañía. A pesar de la escasez de instrumentos, los diferentes trabajos evalúan frecuentemente la innovación desde una perspectiva cognitiva, llegando a ponerla en relación, incluso, con la creatividad (Baron y Tang, 2011; Fillis y Rentschler, 2010; Ward, 2004).

1.3.1.4. Autonomía

El hecho de poder disfrutar de una total autonomía en cuanto a objetivos y líneas de trabajo es la primera de las razones dadas por fundadores de negocios para crear sus empresas (Cromie, 2000; Van Gelderen y Jansen, 2006). En este sentido, la autonomía es la tendencia hacia la creación empresarial en un intento de conseguir cierta libertad individual (Van Gelderen y Jansen, 2006). En contraste con los empleados, los emprendedores tienen que tomar decisiones en ausencia de supervisores, es decir, tienen que desarrollar planes de acción de forma independiente, así como tener el control sobre el cumplimiento de los objetivos marcados (Baum et al. 2007). En otras palabras, las personas con alto nivel de autonomía buscan el control sobre las tareas que realizan y evitan las reglas y restricciones (impuestas por una empresa o un supervisor) y por ello tienden a escoger roles emprendedores (Brandstätter, 1997; Cromie, 2000). En este sentido, diferentes autores muestran evidencias suficientes para estudiar esta variable

como rasgo de la personalidad emprendedora (Rauch y Frese, 2007a; Bradstätter, 1997; Cromie, 2000; Rauch y Frese, 2007; Utsch, Rauch, Rothfub y Frese, 1999).

La investigación sobre la autonomía personal habitualmente está dirigida al área deportiva (Adie, Duda y Ntoumanis, 2008), la autonomía personal en cuanto a capacidad física relacionada con la discapacidad (Banack, Sabiston y Bloom, 2011) y, principalmente, al contexto académico (Cho, Weinsteinb y Wickerb, 2011; Fernández-Alonso, Suárez-Álvarez y Muñiz, 2015). Sin embargo, se ha encontrado una escala que podría tener relación con la autonomía laboral. Se trata de la *Maastricht Autonomy Questionnaire* (Boerjan, Bluyssen, Bleichrodt, Van Weel-Baumgarten y Van Goor, 2010) que consta de 10 ítems pero cuenta con la desventaja de que fue específicamente diseñada para trabajadores del ámbitos de Ciencia de la Salud (enfermeros, auxiliares de residencias, etc).

1.3.1.5. Locus de control

Según Rotter (1966) el reforzamiento de una conducta depende, en gran medida, de que la persona perciba que la obtención de la recompensa es contingente a su propia conducta. En este sentido, el locus de control interno es la atribución causal de que las consecuencias de una conducta dependen de uno mismo. De esta forma se genera una expectativa de que la propia persona puede controlar las consecuencias de sus conductas y, en cierto modo, también su destino y futuro. En contraste, una persona con locus de control externo atribuirá la causa de su conducta a eventos externos a la persona y creará expectativas que dependan más de la suerte o la casualidad que de uno mismo (Rotter, 1966; Rauch y Frese, 2007a; Chell, 2008). Obviamente si una persona percibe que no puede hacer nada para controlar su entorno (pues depende de agentes externos a ella) difícilmente va a ser un emprendedor, por tanto, si algo tiene que ver con la creación y el éxito empresarial es el locus de control interno (Rauch y Frese, 2007b). De

este modo, una persona con locus de control interno alto presenta una alta probabilidad de convertirse en emprendedor, tal es así que diferentes trabajos han demostrado que los empresarios presentan un locus de control interno más alto que los gerentes (Cromie y Johns, 1983; Schiller y Crewson, 1997). Si bien es cierto que existen ciertas controversias sobre la medición de este constructo en relación a la conducta emprendedora (Kline, 2000; Llewellyn y Wilson, 2003), también lo es que existe un mayor consenso acerca de su estrecha relación. En concreto, en el meta-análisis realizado por Rauch y Frese (2007b) se propone como uno de los predictores de la conducta empresarial.

A la hora de llevar a cabo su evaluación, se trata de una variable que ha generado cierta controversia acerca de su dimensionalidad ya desde sus inicios. En sus orígenes el locus de control ha sido medido como una escala de internalismo-externalismo, es decir, como si fuera una única dimensión con dos polos opuestos (Rotter, 1966**).** Así por ejemplo, Perez García (1989), mediante el uso de técnicas factoriales, concluye que la escala de internalismo-externalismo de Rotter (1966) se compone de cuatro factores diferenciados: control general, interpersonal, situaciones de rendimiento y político. Trabajos más actuales dentro del contexto de la empresa muestran que el constructo locus de control no parece ser unidimensional (Oliver, Jose y Brough, 2006). En este sentido, Sánchez (2010) somete a prueba el constructo de locus de control mediante análisis factorial exploratorio y confirmatorio y presenta en sus resultados tres dimensiones interrelacionadas que define como locus interno, locus externo y suerte. En suma, parece que se ha llegado a un acuerdo sobre tomar el locus de control como multidimensional, es decir, locus de control interno y locus de control externo como dos dimensiones diferentes e interrelacionadas (Suárez-Álvarez, Pedrosa, García-Cueto y Muñiz, en prensa).

Al revisar la literatura científica se pueden encontrar diferentes instrumentos válidos y fiables de medición del locus de control. Desde la escala de internalismo-externalismo de Rotter (1966) hasta instrumentos más modernos aplicados tanto a población adulta (Pelechano y Baguena, 1983) como a población adolescente (Pelechano, de Miguel y Pastor, 2002). Dentro del ámbito laboral se puede encontrar la *"Work Locus of Control Scale"* (Spector, 1988), el *"Panel Study of Entrepreneurial Dynamics*" (Schjoedt y Shaver, 2010) o el *Achievement Motivation, Locus of Control and Professional Training Questionnaire* (AmLcT-Q; Suárez-Álvarez et al., 2013). Sin embargo, si de algo ha servido toda la investigación sobre este constructo ha sido para averiguar la influencia determinante que presenta el contexto de aplicación a la hora de construir y validar la prueba. De esta forma, en función de la población diana (adolescentes, adultos, trabajadores, etc.) se construyen tests contaminados, por ejemplo, por el rendimiento académico, la política o el trabajo, dando como resultado tantos factores como temáticas se incluyan (Pérez García, 1984).

1.3.1.6. Autoeficacia

De acuerdo con la teoría del aprendizaje social de Bandura (1977), los cambios conductuales están basados en un proceso cognitivo común y, de esta manera, se postula que todos los procedimientos psicológicos sirven para crear y fortalecer las expectativas y eficiencia personal. En este sentido, la percepción de autoeficacia afecta a las actividades y conductas que la gente elige, a sus estrategias de afrontamiento, a cómo las personas emplean su esfuerzo y durante cuánto tiempo persisten en hacer frente a los obstáculos y las experiencias adversas (Bandura y Adams, 1977; Bandura, Adams, Hardy y Howells, 1980). Por tanto, la percepción de autoeficacia hace referencia a la convicción de que uno puede organizar y ejecutar eficazmente acciones para producir los resultados deseados. Es importante remarcar la diferencia entre esta dimensión y las

expectativas de resultado (Sanjuán, Pérez y Bermúdez, 2000). Las expectativas de resultado aluden a la disponibilidad de los recursos, mientras que la autoeficacia representa a la opinión de lo que uno puede hacer con esos recursos. Por otro lado, como indican Rauch y Frese (2007b), la percepción de autoeficacia tiene una relación directa y significativa con el éxito empresarial. De hecho, su clara relación con la conducta emprendedora ha propiciado que los trabajos que estudian la personalidad emprendedora lo incluyan como uno de sus rasgos específicos (Rauch y Frese, 2007a; Hisrich, Langan-Fox y Grant, 2007; Sánchez, 2010).

A la hora de realizar una evaluación de esta dimensión, existen varios instrumentos creados para tal fin que dan cuenta del amplio campo de investigación en que esta variable presenta relevancia fuera del contexto del espíritu emprendedor como, por ejemplo, la *escala infantil de percepción de autoeficacia* (Carrasco y del Barrio, 2002) o la *escala de autoeficacia para el afrontamiento del estrés* (Godoy, Godoy, López-Chicheri, Martínez, Gutiérrez y Vázquez, 2008). En el contexto específico del espíritu emprendedor, destaca la *escala de autoeficacia emprendedora* (Moriano, Palací y Morales, 2006) y *escala de autoeficacia para el liderazgo emprendedor* (Moriano, Topa, Molero, Entenza y Lévy, 2012). Sin embargo, la principal limitación del primero de estos instrumentos es que fundamenta parte de su evaluación en el planteamiento hipotético de que la persona que responde es empresaria; aspecto que afecta a la validez ecológica de la prueba. Por otro lado, ambas escalas limita la validez de sus resultados a emprendedores con orientación empresarial, lo que excluiría a emprendedores sociales (Dees et al., 2001).

1.3.1.7. Tolerancia al estrés

El término estrés es importado desde la física a la fisiología por Hans Selye, el cual lo describe de forma genérica como la respuesta del organismo ante una situación

estresante (Selye, 1956). Más tarde Lazarus y Folkman (1986) aportan una perspectiva más psicológica al concepto de estrés incluyendo en el anterior esquema el efecto que tiene la percepción personal de un estímulo como estresante y los recursos individuales con que la persona cuenta. En otras palabras, cómo los pensamientos o cogniciones condicionan tanto la respuesta fisiológica como la propia conducta.

En este sentido, el contexto empresarial es fuente infinita de estímulos que pueden ser percibidos como estresantes y, por tanto, dificultar tanto el inicio como el mantenimiento de la conducta emprendedora. En este contexto, la inseguridad y presión con la que se trabaja es elevada, teniendo que tomar decisiones de alto riesgo en relación tanto a los recursos humanos como materiales. Por ello es importante el estudio de la tolerancia al estrés como rasgo específico de la personalidad emprendedora. Así por ejemplo, Wincent y Örtqvist (2009a, 2009b) profundizan en el papel que juega el estrés en los emprendedores llegando a plantear un modelo de ecuaciones estructurales que toma la personalidad como antecedente del estrés. Finalmente, el meta-análisis de Rausch y Frese (2007) establece que la tolerancia al estrés tiene una relación positiva con la creación empresarial.

La evaluación del estrés ha sido abordada desde muchas perspectivas y habitualmente se crean escalas específicas que permiten evaluar el constructo en función de unas determinadas condiciones. Sin embargo, la *escala de estrés percibido* de Cohen, Kamarck y Mermelstein (1983) permite evaluar de forma general este constructo. Trabajos posteriores se han encargado de validar la escala en otras poblaciones como la de trabajadores (Stanton, Balzer, Smith, Parra y Ironson, 2001) e incluso hay versión adaptada a población adulta española (Remor, 2006). Sin embargo, no hay instrumentos de medida que permita evaluar la tolerancia al estrés en el contexto del espíritu emprendedor y adaptado a población joven.

1.3.1.8. Optimismo

La definición de optimismo desde una perspectiva psicológica ha sido construida a dos niveles. En un primer nivel como optimismo disposicional que hace referencia a la creencia que la persona tiene en que le ocurrirán eventos positivos en vez de negativos (Scheier y Carver, 1985). Por otro lado, el optimismo comparativo que se define como la tendencia de las personas a creer que para ellos es menos probable experimentar eventos negativos y más probable experimentar eventos positivos en comparación con otras personas (Shepperd, Carrol, Grace y Terry, 2002). En la actualidad, desde la psicología positiva se está proporcionando una perspectiva diferente de entender el contexto laboral. En este sentido, se investigan sobre qué aspectos tanto del trabajador como del contexto laboral afectan al bienestar personal del trabajador y cómo esto se traduce en productividad para la empresa. Así por ejemplo, se resalta la importancia del humor (Van den Broeck, VanderElst, Dikkers, De Lange y De Witte, 2012) o el optimismo entendido como capital humano (Bakker, Rodríguez-Muñoz y Derks, 2012). En suma, el optimismo permite confiar en que las expectativas que uno tiene podrán ser resueltas en el futuro, aspecto que resulta vital para cualquier conducta emprendedora. Ejemplo de ello es el trabajo de López y García (2011) que estudia el efecto que tiene el optimismo, el pesimismo y el realismo en emprendedores potenciales (i.e. estudiantes universitarios que se consideran personas emprendedoras y les gustaría crear una empresa tecnológica). Los resultados muestran que existen diferencias significativas en optimismo a favor de emprendedores potenciales cuando se comparan con emprendedores no-potenciales. A su vez, no se encuentran diferencias estadísticamente significativas ni en pesimismo ni en realismo. Si bien estos resultados son clarificadores, sería conveniente una mayor profundización, entendiendo este factor

como un rasgo específico de la personalidad emprendedora y validando los resultados con emprendedores reales (i.e. en términos de creación y/o éxito empresarial).

La evaluación del optimismo se ha planteado principalmente desde la perspectiva disposicional y se puede establecer su inicio con la construcción del *Life Orientation Test (LOT)* (Scheier y Carver, 1985) y su versión revisada (Scheier, Carver y Bridges, 1994). Este trabajo muestra múltiples evidencias de validez, además de población universitaria, se ha validado en personas con fibromialgia (Landero y González, 2009) o la de pacientes a la espera de operaciones quirúrgicas (Scheier, Carver y Bridges, 1994). Por otro lado, Otero, Luengo, Romero, Gómez y Castro (1998) se han encargado de su adaptación a población española y Chico (2002), Ferrando, Chico y Tous (2002) y López y García (2011) muestran evidencias de validez sobre dicha población mediante técnicas factoriales. Recientemente se han propuesto alternativas para evaluar optimismo y que permiten solucionar algunas de las limitaciones de los instrumentos existentes (Pedrosa, Celis-Atenas, Suárez-Álvarez, García-Cueto y Muñiz, 2015). Como se puede comprobar, el estudio del optimismo, no ha sido un tema especialmente desarrollado dentro del contexto empresarial, sino que ha sido tratado desde una perspectiva generalista y, especialmente, clínica.

1.4. Instrumentos de evaluación de la personalidad emprendedora

Existen múltiples instrumentos que han sido desarrollados en función del constructo Orientación Empresarial (Entrepreneurial Orientation, según sus siglas en inglés; Covin y Wales, 2012) y que evalúan dimensiones como toma de riesgos, proactividad, innovación, autonomía y agresividad competitiva. Sin embargo, el número de instrumentos se reduce notablemente cuando el objetivo es la evaluación conjunta de los rasgos de la personalidad emprendedora en un único instrumento con coherencia

metodológica, siendo aún más escaso el número de instrumentos desarrollados en España (Muñiz et al., 2014; Sánchez, 2010).

En los últimos años se han hecho importantes contribuciones a la evaluación de los rasgos específicos de la personalidad emprendedora. En la Tabla 3 se presentan las principales baterías de evaluación del espíritu emprendedor desarrolladas hasta la fecha. Alguna de estas escalas están traducidas y adaptadas a diferentes idiomas (Almeida et al., 2014; Caird, 2006; Liñán y Chen, 2006) y están orientadas a la evaluación de diferentes colectivos como universitarios (Caird, 2006) y trabajadores (Almeida et al., 2014). Otro de los aspectos a destacar es la tendencia a desarrollar instrumentos utilizando métodos de autoinforme, habitualmente mediante escalas tipo Likert.

Tabla 3
Principales baterías para la evaluación del espíritu emprendedor

Nombre	Referencia	Dimensiones
Skills Confidence Inventory [SCI]	Betz, Borgen y Harmon (2005)	Realista, investigadora, artística, social, emprendedora y convencional
General Enterprising Tendency [GET2]	Caird (2006)	Necesidad de logro, autonomía, determinación, toma de riesgos y creatividad
Entrepreneurial Aptitude Test [TAI]	Favretto, Pasini y Sartori (2003)	Orientación hacia metas, liderazgo, adaptación, motivación de logro, realización personal, innovación, flexibilidad y autonomía
Entrepreneurial Intention Questionnaire [EIQ]	Liñán y Chen (2006)	Atracción profesional, valoración social, capacidad empresarial e intención empresarial
Cuestionario de orientación emprendedora [COE]	Sánchez (2010)	Locus de control, autoeficacia, propensión al riesgo y proactividad
Measure of Entrepreneurial Talents and Abilities [META]	Almeida, Ahmetoglu y Chamorro-Premuzic (2014)	Creatividad, oportunismo, proactividad y visión

En la Tabla 4 se incluye una valoración global orientativa de la calidad de los instrumentos de medida en función de los criterios establecidos por la Federación Europea de Asociaciones de Psicólogos (EFPA) para la evaluación de los tests (Evers et

al., 2013) y los Estándares para la Evaluación Educativa y Psicológica (American Educational Research Association, American Psychological Association y National Council on Measurement in Education, 2014). La información mostrada en la Tabla 4 corresponde, principalmente, a la información proporcionada por los autores en el documento original en que se muestra el desarrollo del instrumento. Dicha información se ha completado con artículos científicos indexados en bases de datos internacionales. Esto excluye la posible existencia de documentos no indexados en dichas bases que aporten información sobre los aspectos que no se encuentran cubiertos en dicha tabla.

Tabla 4
Valoración psicométrica de los instrumentos de medida para la evaluación del espíritu emprendedor

Instrumento	Fiabilidad	Evidencias de validez de Contenido	Evidencias de validez de constructo	Evidencias de validez de Criterio	DIF	Disponible en español
SCI	✓	✓	✓	✓	-	-
GET2	✓	-	✓	✓	-	-
TAI	✓	-	✓	✓	-	-
EIQ	✓	-	✓	-	-	✓
COE	✓	-	✓	-	-	✓
META	✓	-	✓	✓	-	✓

Nota: DIF = Funcionamiento diferencial de los ítems.
SCI= Skills Confidence Inventory; GET2= General Enterprising Tendency v2; TAI= Entrepreneurial Aptitude Test; EIQ= Entrepreneurial Intention Questionnaire; COE= Cuestionario de orientación emprendedora; META= Measure of Entrepreneurial Talents and Abilities.

Resulta llamativo que si bien algunos autores hacen mención a la validez de contenido, son pocos los que proporcionan datos basados en juicios de expertos e indicadores cuantitativos (Pedrosa, Suárez-Álvarez y García-Cueto, 2013; Sireci, 2003, 2009). Por otro lado, los instrumentos desarrollados llaman la atención por la falta de información proporcionada en relación al análisis de ítems, evidencias de validez predictiva, fiabilidad test-retest y especialmente tanto el Funcionamiento Diferencial de

los Ítems (DIF) como el análisis del sesgo, carencias habitualmente encontradas también en otros instrumentos de medida (Hernández, Tomás, Ferreres y Lloret, 2015). Estudiar el DIF afecta directamente la validez de los resultados ya que permite identificar si existen ítems que perjudiquen sistemáticamente a determinado grupo de personas como por ejemplo, hombres y mujeres (Sandilands, Oliveri, Zumbo y Ercikan, 2013). Analizar el sesgo consistiría en explicar las causas del DIF, aspecto que a pesar de su importancia ha sido poco estudiado y del cual en los últimos años se han hecho grandes avances (Benítez y Padilla, 2014).

1.4.1. Instrumentos de medida en España

En la actualidad existen al menos tres instrumentos de medida para evaluar la personalidad emprendedora en España: EIQ (Liñan y Chen, 2006); COE (Sánchez, 2010) y META (Almeida, Ahmetoglu y Chamorro-Premuzic, 2014). Es importante resaltar que el EIQ y el COE fueron desarrollados originalmente en España mientras que el META fue originalmente desarrollado en Reino Unido. A pesar de que este último puede responderse en español desde su página web (http://www.metaprofiling.com), es importante destacar que hasta la fecha no hay disponible información psicométrica sobre la traducción y adaptación del instrumento al contexto español. Por tanto, no es posible valorar la idoneidad del instrumento para su uso en España según los estándares internacionales (Muñiz, Elosua y Hambleton, 2013). En cuanto a las dimensiones que evalúan, se podría considerar que una parte sustantiva del contenido del constructo de espíritu emprendedor no está incluida (Tabla 3); por ejemplo, la motivación de logro, la autonomía, la tolerancia al estrés o el optimismo (Figura 3). Por otro lado, la principal limitación de los instrumentos desarrollados en España es la falta de evidencias de validez de criterio (Tabla 4). Si bien el uso de estos instrumentos de medida con fines de investigación puede ser adecuado para

determinados objetivos, su utilización aún no sería suficientemente adecuada para tomar decisiones importantes que afecten a las personas en función de su puntuación en espíritu emprendedor. Para ello, sería necesario acumular mayores evidencias de validez en relación con variables externas y probar su capacidad predictiva. En suma, aunque se han desarrollado importantes avances en la evaluación de la personalidad emprendedora aún queda un largo camino por recorrer.

2. Objetivos e hipótesis de la tesis

El principal objetivo de esta tesis doctoral es el desarrollo y validación de un nuevo instrumento de medida que permita evaluar los rasgos fundamentales de la personalidad emprendedora en jóvenes. Para alcanzar este objetivo previamente se realizó una revisión de las dimensiones esenciales de la personalidad emprendedora y se planteó un modelo teórico que permitió el posterior desarrollo de la prueba de evaluación. La construcción del modelo se realizó en función de una exhaustiva revisión de la literatura científica. Además, se llevaron a cabo diferentes investigaciones preliminares con la intención de conocer el funcionamiento de estas variables en diferentes poblaciones, su relación con otras variables, y en definitiva, la progresiva depuración de los instrumentos de medida que posteriormente se utilizarán para evaluar los rasgos esenciales de la personalidad emprendedora. Para alcanzar el objetivo general se plantean cuatro objetivos específicos:

- Objetivo 1: Identificar y desarrollar un modelo integral del espíritu emprendedor.
- Objetivo 2: Construcción de un Banco de Ítems para la evaluación de la Personalidad Emprendedora en una población española de adolescentes.
- Objetivo 3: Determinación precisa de las Propiedades Métricas del Banco de Ítems.
- Objetivo 4: Elaboración de un instrumento de medida fiable y válido para la evaluación de las dimensiones de la Personalidad Emprendedora en adolescentes.

Nos guía la hipótesis general de que si se identifican de forma rigurosa las dimensiones de personalidad implicadas en el constructo de espíritu emprendedor, será factible construir una batería psicométrica que mida de forma fiable y válida dichas dimensiones. Además se plantean cuatro hipótesis específicas para cada uno de los objetivos establecidos:

- Hipótesis 1: Si las investigaciones previas son convergentes, será posible establecer un modelo integral y comprensivo del constructo de Espíritu Emprendedor.
- Hipótesis 2: Si se realiza una exhaustiva revisión sobre el constructo de la Personalidad Emprendedora y se tienen en cuenta los modelos existentes, será posible establecer un amplio Banco de ítems que permita una evaluación rigurosa y exhaustiva del constructo.
- Hipótesis 3: Si los ítems se construyen siguiendo la tecnología psicométrica más reciente, cabe esperar que el Banco de Ítems posea las propiedades psicométricas adecuadas para la evaluación de la Personalidad Emprendedora.
- Hipótesis 4: Si el Banco de ítems representa adecuadamente el constructo de la Personalidad Emprendedora, entonces será factible elaborar una batería que mida de forma válida y fiable dicho constructo.

3. Publicaciones

Los objetivos e hipótesis planteados se desarrollan con detalle en los cinco artículos que se presentan, todos ellos publicados en revistas con Factor de Impacto JCR (*Journal Citation Reports*). En el primer artículo *Screening Enterprising Personality in Youth: An empirical model* (Suárez-Álvarez, Pedrosa et al., 2014) se propone un nuevo modelo de evaluación de la personalidad emprendedora y se desarrolla un banco de ítems para su evaluación. El segundo artículo *Enterprising Personality profile in youth: Components and assessment* (Muñiz et al., 2014) corresponde con la determinación precisa de las propiedades psicométricas del banco de ítems y la construcción de una batería válida y fiable para la evaluación de la Personalidad Emprendedora en adolescentes. El tercer artículo *Self-concept, motivation, expectations, and socioeconomic level as predictors of academic performance in mathematics* (Suárez-Álvarez, Fernández-Alonso et al., 2014) explora diferentes aspectos que podrían ser relevantes para la educación y formación en jóvenes. El cuarto artículo *Assessing perceived emotional intelligence in adolescents: New validity evidence of Trait Meta-Mood Scale–24* (Pedrosa, Suárez-Álvarez et al., 2014) añade nuevas evidencias de validez de un instrumento de medida para evaluar inteligencia emocional percibida en adolescentes españoles. Finalmente, el quinto artículo *New validity evidence support locus of control bidimensionality* (Suárez-Álvarez, Pedrosa, García-Cueto y Muñiz, en prensa) añade nuevas evidencias de validez factorial del constructo locus de control.

3.1. Primer artículo

Suárez-Álvarez, J., Pedrosa, I., García-Cueto, E. y Muñiz, J. (2014). Screening enterprising personality in youth: An empirical model. *The Spanish Journal of Psychology, 17*, 1-9.doi:10.1017/sip.2014.61

El objetivo de este artículo es la revisión de las dimensiones esenciales para evaluar la personalidad emprendedora y el desarrollo de un instrumento de medida que permita su evaluación en adolescentes. La principal aportación de este artículo a la tesis doctoral es el estudio preliminar de la Batería de Evaluación de la Personalidad Emprendedora. Se realizan varios pilotajes cualitativos y cuantitativos para asegurar que los participantes entienden correctamente los ítems desarrollados y para eliminar aquellos ítems con un mal funcionamiento psicométrico.

Factor de Impacto JCR 2014 = 0,586 ; Q3.

Factor de Impacto 5 años = 0,920

Spanish Journal of Psychology (2014), **17**, e60, 1–9.

doi:10.1017/sjp.2014.61

CAMBRIDGE UNIVERSITY PRESS

Screening Enterprising Personality in Youth: An Empirical Model

Javier Suárez-Álvarez, Ignacio Pedrosa, Eduardo García-Cueto and José Muñiz

Universidad de Oviedo (Spain)

Abstract. Entrepreneurial attitudes of individuals are determined by different variables, some of them related to the cognitive and personality characteristics of the person, and others focused on contextual aspects. The aim of this study is to review the essential dimensions of enterprising personality and develop a test that will permit their thorough assessment. Nine dimensions were identified: achievement motivation, risk taking, innovativeness, autonomy, internal locus of control, external locus of control, stress tolerance, self-efficacy and optimism. For the assessment of these dimensions, 161 items were developed which were applied to a sample of 416 students, 54% male and 46% female (M = 17.89 years old, SD = 3.26). After conducting several qualitative and quantitative analyses, the final test was composed of 127 items with acceptable psychometric properties. Alpha coefficients for the subscales ranged from .81 to .98. The validity evidence relative to the content was provided by experts (V = .71, 95% CI = .56 - .85). Construct validity was assessed using different factorial analyses, obtaining a dimensional structure in accordance with the proposed model of nine interdependent dimensions as well as a global factor that groups these nine dimensions (explained variance = 49.07%; χ^2/df = 1.78; GFI= .97; SRMR = .07). Nine out of the 127 items showed Differential Item Functioning as a function of gender ($p < .01$, $R^2 > .035$). The results obtained are discussed and future lines of research analyzed.

Received 12 September 2013; Revised 6 December 2013; Accepted 24 January 2014

Keywords: personality, assessment, enterprising spirit, entrepreneur, business.

There is a growing interest in the study of the characteristics of entrepreneurial individuals (Covin & Wales, 2012); the Global Entrepreneurship Monitor (2012) is the most ambitious international project with the participation of 59 countries worldwide. Furthermore, the Measure of Entrepreneurial Tendencies and Abilities (META) is the strongest and most consistent predictor of entrepreneurial activity (Almeida, Ahmetoglu, & Chamorro-Premuzic, 2014). The idea underlying this and other projects is to learn which characteristics and conditions lead people to be entrepreneurs, whether in business, work or personal spheres. The present study focuses on personality aspects with the aim of ascertaining whether there are certain personality traits that facilitate enterprising activity. It is assumed that who is enterprising today will be an entrepreneur tomorrow. The study of the Personality of Entrepreneurs is a research line that has "taken off" in recent years (Hisrich, Langan-Fox, & Grant, 2007), joining other approaches from the field of economics that explore the essential characteristics of the entrepreneurial spirit. However, it is far from being resolved in convincing fashion. Indeed, this perspective has been strongly criticized for dealing in a reductionist way with the complex world of entrepreneurship (Gartner, 1989). Undoubtedly for this and other reasons there is no univocal definition of the construct. Shane and Venkataraman (2000) consider that entrepreneurship is a process that involves the discovery, evaluation and exploitation of opportunities to introduce new products, services, processes, organization or market forms. Despite this definition being one of the most popular (Baum, Frese, Baron, & Katz, 2007), it is too general. Thus, attending to a more operative definition, different ways of approaching entrepreneurship have emerged, such as proposals by Chell (2008) or Sánchez (2011).

According to Sánchez (2011), current approaches to the study of characteristics and conditionants of enterprising individuals are basically conducted from three broad perspectives: personal (personality, cognitions, and genetic factors), social (social networks, sociocultural and institutional factors) and economic (transaction costs, benefits and innovation effects). From the personal context, and specifically, from the study of the enterprising personality on which the present study is mainly focused, it is possible to clearly distinguish two lines of research: a) studies that defend the presence of general personality factors (Big-Five and similar; Brandstätter, 2011), and b) those that propose more specific enterprising personality traits (Rauch & Frese, 2007a, 2007b).

Correspondence concerning this article should be addressed to Javier Suárez-Álvarez. Psychology Department. Universidad de Oviedo. Plaza Feijoo, s/n. Office 4. 33003. Oviedo (Spain).

E-mail: suarezajavier@uniovi.es

This research was funded by the FPU program of the Spanish Ministerio de Educación, Cultura y Deporte, and the FPI program of the Spanish Ministerio de Economía y Competitividad. References: PSI2011–28638, BES-2012-053488, IB-05–02, and AP2010–1999.

Research in the line of general personality factors such as the Big Five, provide data that indicate that these explain around 13% of the variance of entrepreneurial intention, and 10% of entrepreneurial success (Zhao, Seibert, & Lumpkin, 2010). As Brandstätter (2011) points out, when entrepreneurs are compared with company managers, the former obtain higher scores on openness, conscientiousness and extraversion and lower scores on neuroticism and agreeableness. All this allows establishing a clear relationship between the *Big Five* personality traits and entrepreneurship. Moreover, thanks to its long tradition in Psychology, its relative stability and its possible genetic bases (Jang et al., 2006), the approach focusing on broad traits such as the Big Five currently constitutes an important research line in the study of the entrepreneurial personality (Obschonka, Schmitt-Rodermund, Silbereisen, Goslin, & Potter, 2013). However, the magnitude of the relationship found until now seems to suggest that we are faced with traits that are too general to precisely predict entrepreneurial activity.

Regarding research on more specific personality characteristics, Rauch and Frese (2007a) have conducted a meta-analysis where they collected the most important research. These authors find that, among the variables studied to date, only a few show a significant relationship with entrepreneurship. Innovativeness, proactive personality and self-efficacy have a significant and positive relationship with entrepreneurial success, whereas autonomy and internal locus of control have been established as valid predictors of both creation and entrepreneurial success (Rauch & Frese, 2007a). There is no consensus regarding which of these two approaches, general or specific, is better given that both approaches have never been studied together and there are no rigorous measurement instruments for the assessment of specific variables proposed in the literature. Rauch and Frese (2007b) propose an entrepreneurial personality model that includes both approaches, considering that the essential specific traits of entrepreneurs would be six: achievement motivation, risk- taking, innovativeness, autonomy, locus of control and self-efficacy.

The proposal by Rauch and Frese (2007b) has the advantage of offering a model that integrates the approximation of general traits with more specific ones for the first time; however, an exhaustive review of the literature suggests that, in addition to the six specific traits proposed, there are others that it would be reasonable to include in the model (Carraher, Buchanan, & Puia, 2010; Chell, 2008; Hisrich et al., 2007; Koellinger, 2008; López & García, 2011; Rauch & Frese; 2007a; Suárez-Álvarez, Campillo-Álvarez, Fonseca-Pedrero, García-Cueto, & Muñiz, 2013; Tyszka, Cieslik, Domurat, & Macko, 2011; Wincent & Örtqvist, 2009a, 2009b; Yordanova & Alexandrova-Boshnakova, 2011). According to these previous results, nine specific variables are proposed in order to assess the different specific facets of entrepreneurial personality: achievement motivation, risk-taking, innovativeness, autonomy, self-efficacy, stress tolerance, internal locus of control, external locus of control and optimism.

Research studies are programmed in different stages, and in this first one, the main objective is to develop a measurement instrument that allows the rigorous assessment of the nine specific dimensions proposed. We believe necessary having a rigorous instrument for the assessment of specific enterprising personality trait, because this aspect is the cornerstone on which all research on entrepreneurial psychology must rest. To date, there is no such instrument, and thus, it is our main objective. We hope that this instrument can be used as a screening tool in young populations, to facilitate early detection of enterprising personality, which would aid in their academic and work guidance. The study of the entrepreneurial personality in adolescents is of crucial importance, since early detection can help improve and teach the entrepreneurial characteristics of these young people. Moreover, research can explore not only personal characteristics, but also certain contextual variables that may influence the development of entrepreneurial spirit. Nevertheless, despite the fact that there are some studies on entrepreneurship in adolescents (Bonnett & Furnham, 1991; Burges Sbicigo, & Dell´Anglio, 2013; Schmitt-Rodermund, 2004), none of them focus as we do here on the specific traits of the entrepreneurial personality.

There are several reasons that justify the development of a new measurement instrument, among them, a) few instruments have been developed from a psychological perspective, and the existing ones are too general to assess specific personality traits connected to entrepreneurship (Brandstätter, 2011; Global Entrepreneurship Monitor, 2012; Rauch & Frese, 2007a, 2007b), b) several important specific traits related to entrepreneurship have not been included in previous measurement instruments (Carraher et al., 2010; Chell, 2008; Hisrich et al., 2007; Koellinger, 2008; López & García, 2011; Rauch & Frese; 2007a; Tyszka et al., 2011; Wincent & Örtqvist, 2009a, 2009b; Yordanova & Alexandrova-Boshnakova, 2011), and c) most of research was developed using samples of adult individuals, so there are no instruments for screening potential enterprising personality in youth.

Method

Participants

The sample was composed of 416 students from the Principality of Asturias, a region in northern Spain, with a mean age of 17.89 years and a standard deviation

of 3.26. The sample was obtained using an incidental sampling method and was composed of students in their last year of Compulsory Secondary Education, Post Compulsory Secondary Education (A-Levels), Vocational Training (Intermediate and Higher grades) and First Year University. Fifty-four percent were male and 46% female.

Instruments

With the aim of assessing the nine model dimensions, 161 items with a 5-point *Likert* type scale were developed, where value *1* meant being *completely in disagreement* with the statement and *5 completely in agreement*. A five-category response system was chosen given that the psychometric literature indicates that it is between 4 and 6 categories when the best estimates of the test psychometric parameters are obtained (Lozano, García-Cueto, & Muñiz, 2008). Apart from that, for the construction of the test, the recommendations provided in the current psychometric literature were followed (American Educational Research Association, American Psychological Association & National Council on Measurement in Education, 1999; Downing, 2006; Moreno, Martínez, & Muñiz, 2006). Next, the number of items generated for the assessment of each dimension are detailed, as well as their concise definition. *Achievement motivation* (20 items; for example: *When I'm afraid of making mistakes I make extra effort*, or *I'm persistent when pursuing my goals*) is defined as the desire to achieve standards of excellence, i.e. achieving and improving objectives (Rauch & Frese, 2007b; Suárez-Álvarez et al., 2013). *Risk-taking* (19 items; for example: *I do what I believe in even if there's some risk of losses*, or *I'm capable of renouncing things I already have in order to a achieve a better objective*) makes reference to the tendency and willingness of people to take on certain levels of insecurity that will allow them to achieve a goal that presents greater profits than the possible negative consequences (Moore & Gullone, 1996). *Innovativeness* (19 items; for example: *I'm prepared to incorporate new ideas in my tasks*, or *I see different solutions to problems*) is defined as the willingness and interest in searching for new ways of doing things (Rauch & Frese, 2007b). *Autonomy* (21 items; for example: *I like organizing my work time*, or *I like making my own decisions*) refers to the motivation toward entrepreneurial creation as an attempt to achieve certain individual freedom (Van Gelderen & Jansen, 2006). *Self-efficacy* (21 items; for example: *I take advantage of the resources I have around me*, or *I fell capable of dealing with any unforeseen circumstance*) relates to the conviction that one can efficiently organize and execute actions as well as persist when faced with obstacles to produce the desired results (Costa, Ripoll, Sánchez, & Carvalho, 2013). *Stress tolerance* (19 items; for example: *I'm good at controlling my emotions*, or *I'm able to work under pressure*) is defined as the resistance to perceive environmental stimuli as stressful thanks to the adequate use of coping strategies (Lazarus & Folkman, 1986). *Internal locus of control* (12 items; for example: *Success depends on my efforts*, or *My future depends on what I do*) makes reference to the causal attribution that the consequences of a behavior depend on oneself. This way, an expectation that individuals can control the consequences of their own behavior and, to a certain degree, their destiny and future is generated (Chell, 2008; Rauch & Frese, 2007b; Suárez-Álvarez et al., 2013). *External locus of control* (17 items; for example: *My failures are due to the people around me*, or *I trust to luck for having success in my life*) is based on the causal attribution that the consequences of a behavior are due to events that are external to the person. Thus, expectations are generated that depend more on luck or causality than on oneself (Chell, 2008; Rauch & Frese, 2007b). *Optimism* (13 items; for example: *I'm confident of overcoming problems*, or *I see each challenge as an opportunity for success*) is defined as a person's belief regarding the occurrence of positive events in his life rather than negative ones (Shepperd, Carrol, Grace, & Terry, 2002).

In order to purify the items and obtain content validity evidence, a panel of ten experts from different Spanish universities participated in the study. First, the nine dimensions proposed in the model were presented to them, on which they were expected to indicate the level of pertinence of these in order to establish an enterprising personality profile. In addition, they were presented with all the item pool so that they would assign each item to the dimension they considered appropriate. The obtained data are presented in the results section.

There are four fundamental reasons for using new scales instead of existing ones, a) firstly, there are no scales available in Spain to evaluate the dimensions included in the test, b) existing scales are aimed at adults, whereas our interest is in young people and, while some of the items for adults could be used, the majority are not relevant, c) given that it was about developing a battery of nine subscales, it was important to maintain a homogeneity of style and format throughout, something which would not have been achievable by mixing pre-existing scales with others developed ad hoc, d) many of the existing scales were developed for specific educative or work contexts whereas we were aiming to develop a transversal battery of subscales regardless of the context in which they are applied. The items were designed so that they could be easily understood by the young

people, using a vocabulary in accord with their understanding and coherent content in a youthful context. The pilot studies demonstrated that the young people understood the items perfectly, as those items which caused problems of comprehension and/or interpretation were removed during the pilot. In this way, references to specific work contexts, for example, which are very common in scales designed for adults, were not included. In addition the type of wording used allowed the generalization of the administration of the instrument for other populations and contexts.

The Oviedo Infrequency Scale (Fonseca-Pedrero, Lemos-Giráldez, Paino, Villazón-García, & Muñiz, 2009) was included. This scale is composed of 12 items in a 5-point Likert response format (1 ="*completely disagree*"; 5 ="*completely agree*"). The main objective of this scale is the detection of those participants who respond in a random, pseudorandomly or dishonest fashion.

Procedure

The application of the tests was conducted in a collective manner in the classrooms provided by the Educational Centers. Psychologists trained in the application of psychological instruments applied all tests. In addition, participation was voluntary and previous consent from the principals of the Educational Centers was obtained. Participants did not receive any kind of compensation or reward for their participation in the study.

Data analyses

Firstly, the results of the expert judgment were assessed, eliminating those items that presented less than a third agreement rate among judges. Moreover, *Aiken´s V* coefficient was calculated for the assessment of the degree of agreement among judges regarding the pertinence of the model dimensions. In addition, the cosine was calculated among the assessments provided by the judges regarding the pertinence of the dimensions in order to observe is there was a consensus among their opinions. The cosine is used because the variability of the judges' responses is very low and the Pearson correlation is not adequate under these conditions (Sánchez, Serradilla, Martínez, & Bodadilla, 2008); however, its interpretation is similar to the Pearson correlation (Rius, Barón, Sánchez, & Parras, 1997).

Second, participants who responded randomly or dishonestly to the infrequency scale were eliminated from the sample according to the instructions detailed in Fonseca-Pedrero et al. (2009). Next, the item discrimination indexes were calculated for each scale. Next, an exploratory factor analysis for each scale was conducted using the polychoric correlation matrix and the ULS method in order to study their dimensionality. The pertinence of the unidimensionality of each scale was established as a function of the percentage of explained variance, the goodness-of-fit index –GFI- and the standardized root-mean-square residuals –SRMR-. Subsequently, the reliability coefficient was estimated for each scale using Cronbach's alpha. In addition, a factor analysis was performed following the Principal Axis Factoring method with the factorial scores obtained in the 9 subscales. The goodness-of-fit assessment was determined as a function of the GFI and the SRMR.

Finally, Differential Item Functioning according to sex was assessed by means of the logistic regression procedure (Hidalgo, Gómez, & Padilla, 2005; Zumbo, 1999).

Results

Qualitative analysis

The mean expert judgment regarding the pertinence of the model dimensions was 3.85 on a 1–5 scale. The lower value was received by the *External locus of control* dimension (1.9) whereas *Achievement motivation* obtained the highest value (4.8). On the other hand, *Aiken´s V* content validity coefficient (Aiken, 1980) was equal to .71, with an interval [.56–.85] at the 95% confidence level, which indicates an acceptable degree of agreement with respect to the validity content (Penfield & Giacobbi, 2004). Moreover, the value of the matrix of the cosines among the expert assessments regarding the pertinence of the dimensions to the model is very high (Table 1).

The experts qualified the items in the expected categories in 67% of the cases. Two items were omitted from the original pool as no consensus was reached with respect to their location in the correct dimension.

Psychometric properties of the subscales

Regarding to the psychometric properties of the scales, the discrimination index of the items was calculated first for each of them. Based on this index, 15 items

Table 1. *Matrix of cosines between the 10 experts´ assessments*

Experts	1	2	3	4	5	6	7	8	9
2	.94								
3	.95	.98							
4	.93	.98	.99						
5	.95	.98	.99	.98					
6	.93	.98	.98	.98	.98				
7	.93	.96	.94	.95	.97	.93			
8	.92	.99	.99	.98	.98	.97	.95		
9	.95	.98	.97	.96	.98	.95	.98	.97	
10	.94	.98	.99	.98	.98	.98	.94	.98	.97

were eliminated from the total of nine dimensions for having discrimination indexes lower than .20 (Muñiz, Fidalgo, García-Cueto, Martínez, & Moreno, 2005).

Second, the results obtained in the factorial analysis showed Kaiser-Meyer-Olkin (KMO) indexes above .80, as well as a statistically significant Bartlett´s sphericity index ($p < .001$). Next, in function of the factorial loadings of the items in the first factor of each scale, a total of 17 items were eliminated as they presented values below .20. Taking into account the values that are presented in Table 2, it seems reasonable to assert that the developed scales have an essentially unidimensional structure. As can be observed, the GFI is higher than .92 in all cases. According to the Kelly´s criterion, the SRMR index can be considered adequate in all cases with the exception of the *Autonomy*, *External locus of control* and *Stress tolerance* scales.

On the other hand, the alpha coefficients of the scales range from .81 to .98, which are high values of internal consistency.

Psychometric properties of the overall battery

Once the initial battery was purified in function of the previously specified criteria, a final battery composed of 127 items was obtained with discrimination indexes from .24 to .66. Moreover, the items presented factorial loadings between .24 and .73. The total reliability of the battery, estimated through Cronbach´s α and Carmines θ coefficients is, in both cases, equal to .96.

Table 3 presents the correlation matrix between the factorial scores obtained from the factorial analysis of each subscale. All correlations were statistically significant ($p < .001$).

Following, the results of the factorial analysis conducted on the matrix of the correlations among the participant factorial scores on the subscales are presented. As can be observed in Table 4, the first factor extracted explains 49% of the total variance. Byrne (2001) suggests that the GFI should be higher than .95 and the RMSEA lower to .06. Moreover, the value of the χ^2/df ratio is lower than 2. Regarding all these indexes, it can assert that the fit of the model to the data is adequate, and therefore, it allows to accept an essentially unidimensional structure.

Differential item functioning

Finally, the differential functioning (DIF) of the 127 items was assessed as a function of gender. The logistic regression method was performed adjusting three models at different stages (Hidalgo et al., 2005). In the first stage, the individual total scores on the test are introduced in the equation, thus adjusting Model 1 (M1)

Table 2. *Psychometric properties of the subscales*

	n	DI	α	Factorial loadings	GFI	SRMR (S.E.)	Var. Exp.
Self-Efficacy	20	.28–.66	.98	.27–.62	.98	.045 (.054)	30%
Risk-Taking	15	.24–.59	.84	.30–.61	.98	.050 (.054)	29%
Innovativeness	15	.33–.61	.85	.37–.61	.98	.053 (.053)	31%
Achievement Motivation	15	.37–.63	.88	.40–.66	.99	.04 (.054)	36%
Autonomy	14	.26–.54	.82	.27–.67	.97	.067 (.054)	28%
Internal Locus of Control	9	.27–.61	.85	.43–.73	.99	.043 (.053)	43%
External Locus of Control	14	.28–.58	.84	.30–.70	.97	.066 (.055)	31%
Optimism	11	.40–.62	.85	.40–.72	.99	.046 (.054)	38%
Stress Tolerance	14	.29–.57	.81	.24–.68	.92	.10 (.054)	27%

Note: n: number of items; DI: Discrimination index; α: reliability coefficient; GFI: Goodness-of-fit Index; SRMR: Standardized Root Mean Square Residual; S.E.: Standard error; Var.Exp: percentage of variance explained by the factor

Table 3. *Correlation matrix among factorial scores on each subscale*

	Self-efficacy	RT	IN	AM	AU	IL	EL	OP
Risk-Taking (RT)	.54							
Innovativeness (IN)	.65	.46						
Achievement Motivation (AM)	.81	.51	.65					
Autonomy (AU)	.48	.29	.45	.51				
Internal Locus (IL)	.50	.38	.42	.52	.46			
External Locus (EL)	–.26	–.11	–.20	–.30	–.28	–.39		
Optimism (OP)	.56	.33	.48	.48	.23	.30	–.13	
Stress Tolerance (ST)	.50	.24	.31	.34	.18	.12	–.17	.54

Table 4. *Factorial analysis of the subscales*

	Enterprising Spirit
Self-Efficacy	.92
Achievement Motivation	.88
Innovativeness	.74
Internal Locus of Control	.63
Optimism	.60
Autonomy	.55
Risk-Taking	.55
Stress Tolerance	.49
External Locus of Control	–.35
Explained variance	49.07%
χ^2/df	1.78
GFI	.97
SRMR (S.E.)	.07 (.06)

Note: GFI: Goodness of Fit Index; SRMR: Standardized Root-Mean-Square Residual; S.E.: Standard Error.

according to the absence of DIF. In the second stage, the group variable is added (Model 2, M2). If the explanation of this model with respect to M1 were statistically significant (p<.01), it would indicate a uniform DIF. In stage 3, the interaction between the group and the total score is introduced (Model 3, M3). If the explanation added by this model with respect to the others were significant, there would be a non-uniform DIF (Hidalgo et al., 2005). Nine out of the 127 items showed DIF as a function of gender (p<.01) with a high effect size (R^2>.035; Gomez-Benito, Hidalgo, & Zumbo, 2013), of which 7 showed a uniform DIF and 2 a non-uniform DIF. These nine items appear distributed throughout seven dimensions (Table 5).

Discussion

Recent reviews in the area of enterprising personality research (Brandstätter, 2011; Rauch & Frese, 2007a; Zhao et al., 2010) indicate the requirement of linking the contributions of broad personality traits (Big Five type) with other specific traits that will suggest greater precision in the predictions. Based on the entrepreneurial personality model proposed by Rauch & Frese (2007b), and from the more recent literature review (Carraher et al., 2010; Chell, 2008; Hisrich et al., 2007; Koellinger, 2008; López & García, 2011; Rauch & Frese; 2007a; Suárez-Álvarez et al., 2013; Tyszka et al., 2011; Wincent & Örtqvist, 2009a, 2009b; Yordanova & Alexandrova-Boshnakova, 2011), in the present study, a complementary model to this one is proposed, incorporating new specific variables of the enterprising personality.

This paper has focused on the development of an instrument to assess the nine specific dimensions proposed: *achievement motivation, risk-taking, autonomy, self-efficacy, stress tolerance, innovativeness, internal locus of control, external locus of control* and *optimism*. The results show that the test developed allows to precisely assessing these dimensions. Both, the different subscales as well as the overall battery show high reliability rates -alpha values above .81-, as well as adequate content and construct validity evidence. In addition, the high internal consistency of the battery permits the definition and assessment of a global factor that groups these nine dimensions.

The greatest novelty provided by these results is the possibility of empirically generating and assessing an enterprising personality profile in function of the specific traits proposed. In essence, a starting point can be established, both at the empirical and theoretical levels, from which to trace the road toward the early detection of entrepreneurial personality. The practical implications of having this valid and reliable instrument are maximized if it is directed at adolescents or individuals who are still in the process of academic formation. The reason for this is that it would imply two clearly positive aspects. First, it helps determine whether a person have a potentially entrepreneurial profile, and is therefore more prone to business success. This fact would allow the reduction,

Table 5. *Differential functioning of items: probabilities (p) associated with regression models (M) and effect size (R^2)*

Item	Dimension	$\chi^2_{M3\text{-}M1}$ *(p)*	$R^2_{M3\text{-}M1}$	$R^2_{M2\text{-}M1}$	$R^2_{M3\text{-}M2}$
19	Optimism	10.89 *(< .01)*	2.61	2.13	0.48
48	Innovativeness	21.51 *(< .01)*	4.77	5.05	0.28
121	Innovativeness	16.54 *(< .01)*	3.39	0.68	2.71
21	Self-Efficacy	11.12 *(< .01)*	2.30	1.89	0.41
60	External Locus	20.37 *(< .01)*	4.84	4.84	0
106	External Locus	19.45 *(< .01)*	7.47	2.03	5.44
156	Achievement Motivation	15.07 *(< .01)*	3.49	3.24	0.25
9	Risk-Taking	14.10 *(< .01)*	3.78	3.32	0.46
124	Stress Tolerance	17.44 *(< .01)*	4.88	4.70	0.18

Note: $R^2_{M2\text{-}M1}$ implies Uniform DIF, $R^2_{M3\text{-}M2}$ implies Non-Uniform DIF.

as far as possible, of the uncertainty and the perception of risk that anyone is faced with when starting a business. On the other hand, the early detection of the enterprising personality offers the possibility of focalizing academic training toward more specific spheres related to the business world. Thus, those adolescents who, trying to develop their enterprising spirit, have adequate conditions at the personal and contextual levels increase their probabilities of having business success. In sum, the specific traits presented here are modifiable and, therefore, open to change through the right form of intervention, such as specific education programmes (Chandler, DeTienne, McKelvie, & Mumford, 2011; Peterman & Kennedy, 2003; Souitaris, Zerbinati, & Al-Laham, 2007). The assumption is that entrepreneurial spirit can be promoted from adolescence onwards, providing the adult with effective psychological tools for business creation and success.

In future research it will be necessary to explore the extent to which these results obtained in a Spanish sample are comparable to those found in other cultures (Cheng, Cheung, Chio, & Chan, 2013). From a bio-psycho-social approach to behaviour it would seem reasonable to think that socio-cultural conditioning factors will necessarily influence the constructs of the entrepreneurial personality. As a limitation of the study, it can be mentioned that it would be desirable to improve the sample in future research, both in the sampling and in the number of participants, for which we have to be cautious when making generalizations of the results. Future research lines are directed at completing the enterprising profile taking into account both, the assessment and the existing relationship between the remaining variables considered in the model. Moreover, it is necessary to incorporate an external criterion that allows to increase the validity evidence of the instrument developed. Finally, an item pool is intended to be developed that will allow, through the Item Response Theory, their computer adaptive application.

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3.2. Segundo artículo

Muñiz, J., Suárez-Álvarez, J., Pedrosa, I., Fonseca-Pedrero, E. y García-Cueto, E. (2014). Enterprising personality profile in youth: Components and assessment. *Psicothema*, *26*(4), 545-553. doi: 10.7334/psicothema2014.182

El objetivo de este artículo es el desarrollo y validación de un nuevo instrumento de medida que permita evaluar los rasgos fundamentales de la personalidad emprendedora de los jóvenes. Este artículo es la piedra angular de la esta Tesis Doctoral y supone el artículo central en el que se presentan las propiedades psicométricas de la Batería de Evaluación de la Personalidad Emprendedora.

Factor de Impacto JCR 2014 = 1,210; Q2.

Factor de Impacto 5 años = 1,097

Psicothema

Psicothema 2014, Vol. 26, No. 4, 545-553
doi: 10.7334/psicothema2014.182

ISSN 0214 - 9915 CODEN PSOTEG

www.psicothema.com

Enterprising personality profile in youth: Components and assessment

José Muñiz[1], Javier Suárez-Álvarez[1], Ignacio Pedrosa[1], Eduardo Fonseca-Pedrero[2] and Eduardo García-Cueto[1]
[1] Universidad de Oviedo and [2] Universidad de La Rioja

Abstract

Background: In the study of enterprising personality, there are two main approaches, the utilization of general personality traits, such as Big Five, and the use of more specific traits. The aim of the present work is to develop and validate a new measurement instrument that will permit a rigorous assessment of the basic traits of enterprising personality in young people. **Method:** A sample of 2,693 students (51% males) from different regions in northern Spain was used. Mean age was 16.52 years (SD = 1.38), with an age range of 16 to 23. Eight principal dimensions of enterprising personality were identified, and a new battery of tests was developed for their assessment. **Results:** The reliability coefficients of the battery scales were over .80. Common variance among the eight specific personality dimensions and the Big Five factors was 24%, and with three emotional intelligence dimensions, it was 16%. The enterprising personality traits show a very low correlation with socio-economic status (r = .126), and a moderate correlation with estimations of entrepreneurial spirit by teachers (r = .385). **Conclusions:** Eight specific dimensions of enterprising personality in youth have been identified, and a new battery for their assessment, with adequate psychometric properties, was developed.

Keywords: Personality, entrepreneurs, youth, big five factors.

Resumen

Perfil de personalidad emprendedora en jóvenes: componentes y evaluación. **Antecedentes:** en el estudio de la personalidad de los emprendedores destacan dos enfoques principales, uno centrado en los rasgos generales tipo big five y otro en rasgos más específicos. El objetivo del presente trabajo es el desarrollo y validación de un nuevo instrumento de medida que permita evaluar los rasgos fundamentales de la personalidad emprendedora de los jóvenes. **Método:** se utilizó una muestra de 2.693 estudiantes (51% hombres) de distintas regiones del norte de España. La media de las edades fue de 16,52 (DT= 1,38), con un rango entre 16 y 23 años. Se identificaron ocho dimensiones principales de la personalidad emprendedora. **Resultados:** los coeficientes de fiabilidad de las escalas de la batería están por encima de .80. La varianza común entre las ocho dimensiones de personalidad y los big five factors fue del 24%, y con tres dimensiones de inteligencia emocional fue del 16%. La personalidad emprendedora tiene una correlación muy baja con el nivel socioeconómico (r = .126) y moderada con el espíritu emprendedor estimado por los profesores (r = .385). **Conclusiones:** se han identificado ocho dimensiones específicas de la personalidad emprendedora de los jóvenes, y se desarrolló una nueva batería para su evaluación, con unas propiedades psicométricas adecuadas.

Palabras clave: personalidad, emprendedores, jóvenes, cinco grandes factores de personalidad.

The early part of the twentieth century saw more technological changes than almost any other period in the history of humankind, and classic authors in the field of economics, such as Schumpeter (1911), Taussig (1915) or Knight (1921) set about analyzing the role of people in these changes. It was in this context of economic development that there first emerged the concept of entrepreneurship to define the individual capable of changing the direction of society thanks to an ability to identify aspects of the technological market, to innovate, and to extend its boundaries (Baum, Frese, Baron, & Katz, 2007). Today, international initiatives such as the Global Entrepreneurship Monitor (2013) assess the entrepreneurial activity, aspirations and attitudes of individuals across a wide range of countries. As pointed out by the *Organization for Economic Cooperation and Development* (OECD), fostering entrepreneurial spirit is fundamental to the development of market economies (OECD/The European Commission, 2013). A recent meta-analysis carried out by Zhao, Seibert, and Lumpkin (2010) highlights the crucial role of entrepreneurial spirit in modern economies. These authors argue that the failure of an entrepreneur involves a cost to society in terms of lost opportunities and resources, and is detrimental to the individual, both economically and psychologically (Zhao et al., 2010).

Various approaches and models have been proposed to explain the concept of entrepreneurial spirit, some of the most notable being the *Theory of Entrepreneurship* (Kirzner, 1973), the *Entrepreneurial Event Model* (Shapero & Sokol, 1982), the *Theory of Planned Behaviour* (Ajzen, 1991), or Veciana's Model (1999). These models differ in the variables they include, but to date, no measurement instruments have been developed that would permit a

Received: March 14, 2014 • Accepted: July 2, 2014
Corresponding author: José Muñiz
Facultad de Psicología
Universidad de Oviedo
33003 Oviedo (Spain)
e-mail: jmuniz@uniovi.es

rigorous empirical assessment of the characteristics of enterprising individuals. The most commonly used measurement instrument is the Measure of Entrepreneurial Tendencies and Abilities (META; Almeida, Ahmetoglu, & Chamorro-Premuzic, 2014). In recent years, there has been a considerable amount of research from a psychological perspective, which has attempted to include in the models some aspects that were absent from the classic studies carried out from a more economic perspective (Brandstätter, 2011; Chell, 2008; Covin & Wales, 2012; Hisrich, Langan-Fox, & Grant, 2007; Rauch & Frese, 2007a, 2007b; Suárez-Álvarez, Pedrosa, García-Cueto, & Muñiz, 2014; Zhao et al., 2010). The development of comprehensive models and explanations of entrepreneurial spirit requires taking into account psychological variables, from both the cognitive field (Abilities) and that of personality (Rauch & Frese, 2007a, 2007b). The study of enterprising personality has taken on great vigour in the last few years, and within this body of research, we can identify two main approaches. On the one hand are those authors who prefer to work with broad personality traits, such as the Big Five (Brandstätter, 2011; Obschonka, Schmitt-Rodermund, Silbereisen, Goslin, & Potter, 2013; Zhao et al., 2010), and on the other are those who propose the use of traits that are more specific, and more closely linked to entrepreneurial activity (Rauch & Frese, 2007a, 2007b; Suárez-Álvarez et al., 2014). Those who favour the use of broad personality traits of the Big Five type argue that these factors (Extraversion, Emotional Stability, Conscientiousness, Agreeableness, and Openness to Experience) explain a substantial portion of the variance of entrepreneurial activity (around 13%) and entrepreneurial success (around 10%; Zhao et al., 2010), and correlate strongly with the activity of entrepreneurs and managers (Brandstätter, 2011). Moreover, this perspective on personality has a long tradition in Psychology, and there is a great deal of data on the correlates of these broad factors with different aspects of behaviour (Jang et al., 2006). The core argument endorsing the use of models based on specific personality traits instead of more general ones is that such traits would be capable of taking into account more specific aspects of the enterprising personality, so that the predictions made from them would be more accurate. This is a plausible hypothesis about which initial data have already been collected, reflecting moderate relations between specific personality traits, entrepreneurial creation and business success (Rauch & Frese, 2007a, 2007b). Comparisons between entrepreneurs and other populations reveal that the former score higher on specific traits such as achievement motivation, risk-taking, innovativeness, and internal locus of control (Collins, Hanges, & Locke, 2004; Rauch & Frese, 2007a; Stewart & Roth, 2004). Innovativeness, self-efficacy, and proactive personality show significant and positive relationships with entrepreneurial success, whereas internal locus of control and autonomy have been established as valid predictors of both entrepreneurial creation and success in business (Rauch & Frese, 2007a). According to the research results to date, the specific personality traits most closely linked to enterprising personality would be achievement motivation, risk-taking, innovativeness, autonomy, self-efficacy, stress tolerance, internal locus of control, and optimism (Baum et al., 2007; Rauch & Frese, 2007a, 2007b; Suárez-Álvarez et al., 2014).

Apart from these two principal lines of work, within the psychological approach to the study of enterprising individuals, many other variables have been studied that could be related to entrepreneurial behaviour. Worthy of special mention are the works that address the concept of Emotional Intelligence (EI) (Ahmetoglu, Leutner, & Chamorro-Premuzic, 2011; Mayer & Salovery, 1997). Various studies have highlighted the relationship between EI and personality traits such as innovation (Suliman & Al-Shaikh, 2007), proactivity (Sunindijo, Hadikusumo, & Ogunlana, 2007) or the tendency to take risks (Hadizade, Raminmehr, & Hosseini, 2009); associations have also been found between EI and entrepreneurial attitude (Neqabi & Bahadori, 2012; Pradhan & Nath, 2012) and business results (Ahmetoglu et al., 2011).

The present work is based on the approach that sets out to use specific traits to assess the personality dimensions of enterprising individuals. As already mentioned, this approach has certain advantages over those that use more general, Big-Five-type traits. Moreover, we work with a young population, given the potential benefits of the early detection of entrepreneurial spirit, which can be of help, for example, in relation to academic and careers guidance for students (Athayde, 2009; Geldhof, Weiner, Agans, Mueller, & Lerner, 2014; Peterman & Kennedy, 2003; Souitaris, Zerbinati, & Al-Laham, 2007). The specific objective of our study is the development and validation of a new measurement instrument that would permit a rigorous assessment of the fundamental traits of enterprising personality in young people. The data available so far allow fairly accurate identification of the specific traits of the enterprising personality, such as achievement motivation, risk-taking, innovativeness, autonomy, self-efficacy, stress tolerance, internal locus of control, and optimism (Baum et al., 2007; Rauch & Frese, 2007a, 2007b; Suárez-Álvarez et al., 2014), and there is a clear need for an instrument that can thoroughly assess all the dimensions proposed (Almeida et al., 2014; Lim & Envick, 2013; Liñán & Chen, 2006; Sánchez, 2010; Stormer, Kline, & Goldenberg, 1999). Even though there are instruments designed to evaluate some of the mentioned dimensions (Aguado, Rubio, & Lucia, 2011; Janssen, 2000; Moriano, Palací, & Morales, 2006; Schuler, Thornton, Frintrup, & Mueller-Hanson, 2004), there is as yet no methodologically coherent tool for assessing them all at the same time, and which would permit the formulation of a reliable profile that included all the essential components of the enterprising personality. The majority of the existing instruments have been developed for particular educational or occupational contexts, and were mainly designed for adults (Almeida et al., 2014; Kreiser, Marino, & Weaver, 2002; Lim & Envick, 2013; Liñán & Chen, 2006; Stormer, Kline, & Goldenberg, 1999), whilst the aim of the present work is to develop an invariant instrument, applicable to all types of population and contexts. Furthermore, the data related to the specific personality traits assessed by the new measurement instrument will be analyzed jointly with (a) those obtained for general personality traits (Big Five), and (b) three dimensions of EI. This will allow us to gather sources of validity evidence and to learn more about the relations between specific-trait models and general-trait models, as well as exploring the role of EI with regard to these models. Sources of validity evidence will also be provided in relation to academic performance, socio-economic status and teachers' external ratings of enterprising personality in their students.

Method

Participants

The sample was obtained using a stratified sampling method, and was made up of 2,693 students (51% males) from different

regions in northern Spain (92.8% Asturias, 3.2% Cantabria, and 4% Leon). The strata were created on the basis of geographical area (21.1% rural, 9.1% coastal, and 69.7% urban), type of secondary school (60.8% public, 35.7% state-subsidized private, and 3.5% private), and educational stage (34.2% compulsory, 57.6% post-compulsory, and 8.2% vocational training). Mean age was 16.52 years (SD=1.38), with an age range of 16 to 23 (55% aged 14 to 16, 38% aged 17 to 18, and 7% aged 19 to 23).

Instruments

Battery for the Assessment of the Enterprising Personality (BEPE). The BEPE questionnaire assesses the eight specific personality traits identified in the literature as most promising for the description of the enterprising personality: achievement motivation, risk-taking, innovativeness, autonomy, self-efficacy, stress tolerance, internal locus of control, and optimism (Baum et al., 2007; Rauch & Frese, 2007a, 2007b; Suárez-Álvarez et al., 2014). The battery was originally made up of 115 items with 5-point Likert-type response scales, where 1 represented being *completely in disagreement* with the statement and 5 *completely in agreement*. A five-category response system was chosen, given that the psychometric literature indicates that it is with 4 to 6 categories that the best estimates of psychometric test parameters are obtained (Lozano, García-Cueto, & Muñiz, 2008). Apart from this, the recommendations for test construction provided in the current psychometric literature were followed (American Educational Research Association, American Psychological Association & National Council on Measurement in Education, 2014; Downing, 2006; Downing & Haladyna, 2006; Evers et al., 2013; Kane, 2006; Moreno, Martínez, & Muñiz, 2006; Muñiz, Elosua, & Hambleton, 2013; Schmeiser & Welch, 2006; Wilson, 2005). The items were developed so that they could be easily understood by the young people, using vocabulary in accord with their ability to understand and content suitable for their age group. Previous studies (Suárez-Álvarez et al., 2014) have shown that the young people understood the items perfectly, after removal of those items that caused problems with comprehension and/or interpretation.

We now briefly define each of the battery components; for a more detailed description of the dimensions and their construction process, see Suárez-Álvarez et al. (2014). *Achievement motivation* (15 items) can be defined as the desire to achieve standards of excellence (Rauch & Frese, 2007b; Suárez-Álvarez, Campillo-Álvarez, Fonseca-Pedrero, García-Cueto, & Muñiz, 2013). *Risk-taking* (15 items) refers to people's tendency and willingness to take on certain levels of insecurity that will allow them to achieve a goal that presents greater benefits than the possible negative consequences (Moore & Gullone, 1996). *Autonomy* (14 items) refers to the motivation for entrepreneurial creation as an attempt to achieve a certain individual freedom (Van Gelderen & Jansen, 2006). *Self-efficacy* (20 items) denotes the conviction that one can efficiently organize and execute actions, as well as persisting when faced with obstacles, to produce the desired results (Costa et al., 2013). *Stress tolerance* (14 items) is defined as the resistance to perceive environmental stimuli as stressful thanks to the adequate use of coping strategies (Lazarus & Folkman, 1986). *Innovativeness* (15 items) refers to willingness and interest as regards seeking new ways of doing things (Rauch & Frese, 2007b). *Internal locus of control* (11 items) concerns the causal attribution that the consequences of a behaviour depend on oneself (Chell, 2008; Rauch & Frese, 2007b; Suárez-Álvarez et al., 2013). *Optimism* (11 items) is defined as a person's belief regarding the occurrence of positive events in his or her life rather than negative ones (Shepperd, Carrol, Grace, & Terry, 2002). The psychometric properties of the battery are shown in the results section. A previous version of the battery (Suárez-Álvarez et al., 2014) yielded adequate reliability, with alpha coefficients for the subscales ranging from .81 (Stress tolerance) to .98 (Self-efficacy). Likewise, all the subscales present an essentially one-dimensional structure, with percentages of variance explained by the first factor ranging from 27% (Stress tolerance) to 43% (Optimism). A second-order factor analysis revealed that all the subscales conform a single dimension, which permits us to speak of a general factor of enterprising personality.

Big-Five personality questionnaire (OPERAS). General personality traits were measured with the Overall Personality Assessment Scale (OPERAS; Vigil-Colet, Morales-Vives, Camps, Tous, & Lorenzo-Seva, 2013). This questionnaire assesses the Big Five personality traits (Extraversion, Emotional Stability, Conscientiousness, Agreeableness, and Openness to Experience), with seven items on each subscale. The instrument was validated in Spanish population, yielding reliability coefficients for the subscales ranging from .71 to .86, while its convergent validity is adequate (Vigil-Colet et al., 2013)

Emotional intelligence scale (TMMS-24). Emotional Intelligence was assessed with the Spanish adaption of the Trait Meta-Mood Scale (TMMS-24; Fernández-Berrocal, Extremera, & Ramos, 2004; Extremera & Fernández-Berrocal, 2005). This questionnaire consists of three subscales: *Attention* (8 items), which assesses people's tendency to observe and think about their feelings and emotional states, *Clarity* (8 items), which assesses the degree to which people understand their emotional states, and *Repair* (8 items), which evaluates the perception that one can regulate one's own feelings. The Spanish adaption shows reliability coefficients for the subscales ranging from .79 to .86 in adolescents (Extremera, Durán, & Rey, 2007; Fernández-Berrocal, Alcaide, Extremera, & Pizarro, 2006; Salguero, Fernández-Berrocal, Balluerka, & Aritzeta, 2010).

Socio-economic status scale. Participants' socio-economic status was assessed by means of a 9-item questionnaire that rates aspects related to their socio-economic status as indicated by features of their home: number of bathrooms/toilets, studies, living rooms, cars, bicycles, telephones, televisions, camera, and books. The questionnaire was validated in Spanish population, and yielded an essentially one-dimensional structure and a reliability coefficient of .80 (García-Cueto, Pedrosa, Suárez-Álvarez, & Robles, 2013).

Infrequency scale. This scale is made up of 10 items with 5-point Likert response format (1 = *completely disagree*, to 5 = *completely agree*). The main objective of this questionnaire is to detect those participants who respond in a random, pseudo-random or dishonest fashion. Examples of items would be: *I think rich people have more money than poor people,* or *When I'm very tired, I feel like resting*. The answers to this kind of items are obvious, so that we would expect people who respond rigorously to score high (4 or 5). It is a question of eliminating those respondents who assign values to these types of item of 3 or less. Fitting this criterion to the empirical distribution of the scale scores, the cut-off point was finally set at a score of 34, ruling

out those participants who scored below this value. In accordance with this criterion, 171 participants (5.79%) were removed from the analysis.

Procedure

The instruments were administered in group format in the classrooms provided by the schools, and were applied by psychologists trained in the use of these tools. Participation was voluntary, and consent for running the study was obtained from the head teachers of all the schools. Participants did not receive any kind of compensation or reward for taking part. The Ethics Committee of the Psychology Faculty at the University of Oviedo gave its approval for the research.

Data analyses

First of all, to determine the psychometric properties of the eight subscales of the BEPE, we carried out an analysis of the items for each scale separately. To this end, the discrimination indexes were calculated, the differential item functioning by gender was estimated through logistic regression (Gómez-Benito, Hidalgo, & Zumbo, 2013; Zumbo, 1999), and Exploratory Factor Analyses were carried out, using the tetrachoric correlation matrix. The unweighted least squares method was used because it showed the best fit of the data to the model. For determining the dimensionality of each subscale the parallel analysis (PA) method was used (Horn, 1965), with 10,000 resamplings in accordance with Timmerman and Lorenzo-Seva's (2011) optimization. The percentage of explained variance, the goodness-of-fit index (GFI) and the root mean square residuals (RMSR) were taken into account. Finally, the reliability of the subscales by means of Cronbach's alpha coefficient for ordinal data was calculated (Elosua & Zumbo, 2008).

To estimate the psychometric properties of the BEPE scores, an Exploratory Factor Analysis was carried out, using as input the Pearson correlations matrix between the eight subscales. The extraction method used was Maximum Likelihood. For determining the number of factors, we took into account the percentage of explained variance, the GFI and the RMSR, together with the PA method optimized by Timmerman and Lorenzo-Seva (2011). Fit is considered adequate when the GFI value is .90 or more, and those of the RMSR are .08 or less (Kline, 2011). For estimating the Information Function of the battery the Graded Response Model was used (Samejima, 1969, 1997).

Pearson correlations matrix between the eight dimensions of the BEPE and the Big Five personality factors were calculated, together with the canonical correlation between the two sets of variables. Moreover, to estimate the common variance between the two groups of variables the redundancy coefficient was calculated. We proceeded in the same way for studying the relations between the eight components of enterprising personality and the three dimensions of Emotional Intelligence. We also calculated the multiple correlations between the eight dimensions of the questionnaire with four criteria: a) participants' scores on the socio-economic status scale, b) students' grades in Mathematics and in Spanish Language and Literature, c) scores assigned to the students by their teachers for entrepreneurial spirit, and d) students' self-rating of their capacity for running a business in the future. The data were analyzed with SPSS 19 (IBM Corp., 2010), MULTILOG-MG 7.03 (Zimowski, Muraki, Mislevy, & Bock, 1996), and FACTOR 9.2 (Lorenzo-Seva & Ferrando, 2006).

Results

Psychometric properties of the BEPE questionnaire

The item analysis was carried out for each of the eight scales separately. First of all those items with low discrimination indexes were removed (Muñiz, Fidalgo, García-Cueto, Martínez, & Moreno, 2005). All the scales were made up of items with discrimination indexes ranging from .25 to .65. Following the procedure set out by Gómez-Benito et al. (2013), four items that presented Differential Item Functioning (DIF) by gender were eliminated.

The results obtained in the exploratory factor analysis (EFA) showed Kaiser-Meyer-Olkin (KMO) indexes above .80, as well as a statistically significant Bartlett's sphericity index (p<.001). All the factor loadings were in the range .32 to .77. Table 1 shows the number of items in the scales, the discrimination indexes, the reliability, and the internal structure of the scores on the scale items, after removal of the items whose psychometric properties were inadequate. As it can be seen, the GFI is above .95, the RMSR is under .08 and the percentage of variance explained by the factor is over 30% in all cases. In line with these criteria it can be stated that each of the scales has an essentially one-dimensional structure (Kline, 2011). The alpha coefficients of the scales are adequate, with values between .81 and .91.

The results obtained in the second order EFA showed KMO indexes above .80, as well as a statistically significant Bartlett's sphericity index (p<.001). The correlations matrix between the scores on the battery's subscales (Table 2) indicates that the eight personality traits are highly related among themselves (p<.001). As can be seen in Table 3, a single factor explains 50.32% of the variance, the GFI is over .95 and the RMSR is under .08. According to these data, it would seem reasonable to maintain the hypothesis of essential one-dimensionality and accept the existence of a second-order factor called Enterprising Personality, which would be made up of the eight facets assessed by the scales developed. The alpha coefficient of the complete battery was .92.

Table 1
Items discrimination indexes, reliability and factorial validity of the BEPE subscales

	n	DI	α	Factor loadings	GFI	RMSR	Exp. Var.
Self-Efficacy	17	.38-.63	.91	.44-.72	.99	.048	39%
Risk-Taking	9	.42-.56	.80	.45-.65	.99	.040	38%
Innovativeness	12	.34-.49	.81	.42-.61	.97	.073	32%
Achievement motivation	11	.36-.57	.81	.39-.66	.98	.051	33%
Autonomy	11	.32-.58	.85	.32-.58	.99	.051	37%
Internal locus of control	8	.29-.55	.83	.36-.73	.99	.058	42%
Optimism	9	.38-.61	.83	.42-.68	.98	.068	53%
Stress tolerance	10	.34-.65	.87	.39-.77	.98	.067	42%

Note: n: Number of items; DI: Discrimination index; α: Reliability coefficient; GFI: Goodness-of-fit Index; RMSR: Root-Mean-Square Residual; Exp. Var.: Percentage of Explained Variance for the first factor

Table 2
Correlations between the BEPE subscales

	AU	ST	IN	IL	AM	OP	RT
Self-Efficacy (SE)	.497	.518	.597	.373	.784	.642	.483
Autonomy (AU)		.222	.451	.330	.532	.324	.337
Stress Tolerance (ST)			.257	.160	.370	.529	.255
Innovativeness (IN)				.311	.554	.430	.395
Internal Loc. Con. (IL)					.383	.370	.283
Achiev. Motiv. (AM)						.521	.438
Optimism (OP)							.388
Risk-taking (RT)							

Table 3
Second-order exploratory factor analysis of the BEPE subscales

	Enterprising Personality
Self-Efficacy	.92
Achievement motivation	.84
Optimism	.69
Innovativeness	.65
Autonomy	.57
Risk-taking	.54
Stress tolerance	.53
Internal locus	.44
Explained variance	50.32%
GFI	.98
RMSR	.057

Note: GFI: Goodness of Fit Index; RMSR: Root-Mean-Square Residuals

Information Function

The Information Function (Figure 1) indicates the degree of accuracy with which the battery measures for the different levels of the variable being assessed. As can be seen in Figure 1, the BEPE measures quite accurately for the majority of the values (Θ between -3 and +2), with accuracy falling slightly from the value Θ = 2 onwards. Note that if the scores are distributed according to the normal curve, it means that the BEPE shows an appropriate level of accuracy for over 95% of respondents assessed.

Specific personality traits versus general traits (Big Five)

Table 4 shows the Pearson correlations between the eight specific dimensions of the BEPE and the OPERAS subscales. The highest correlations were found between Stress tolerance and Emotional stability (r = .626), Optimism and Emotional stability (r = .620), and Achievement motivation and Conscientiousness (r = .608). The canonical correlation between the eight dimensions of the BEPE and the Big Five factors was .76. The redundancy coefficient for the first set of variables was .24.

Emotional Intelligence

Table 5 shows the Pearson correlations between the eight dimensions of the BEPE questionnaire and the three dimensions of the TMMS-24. The dimensions most strongly related to those of the BEPE questionnaire were Clarity and Emotional repair; on the other hand, there was practically no relationship with the Attention dimension. The canonical correlation between the eight BEPE scales and the TMMS-24 was .70, and the redundancy coefficient for the first set of variables was .16.

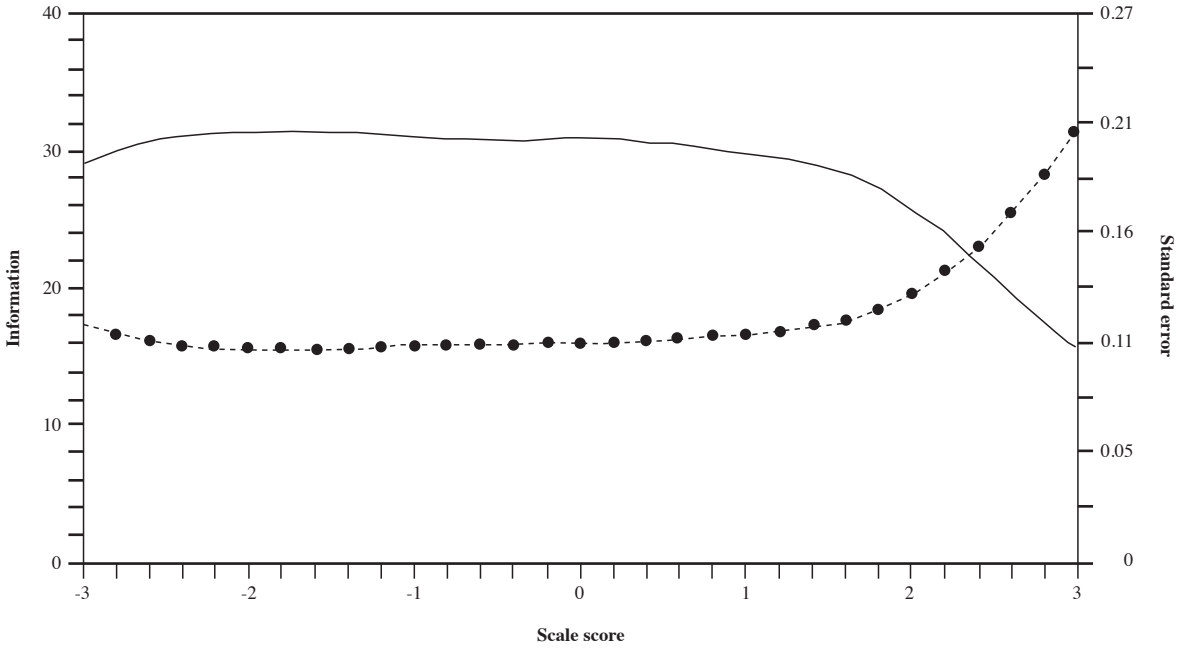

Figure 1. *Information Function of the BEPE questionnaire*

Table 4
Correlations between enterprising personality traits and the Big Five factors of personality

Enterprising personality traits	Openness	Extraversion	Agreeableness	Emotional stability	Conscientiousness
Self-efficacy	.236	.256	.096	.397	.462
Autonomy	.308	.102	.081	.167	.355
Stress tolerance	.081	.163	.148	.626	.247
Innovativeness	.413	.264	.226	.198	.294
Internal locus	.161	.081	.203	.176	.265
Achievement motivation	.301	.180	.168	.273	.608
Optimism	.147	.309	.261	.620	.327
Risk-Taking	.137	.328	.006	.217	.141

Table 5
Correlations between enterprising personality traits (BEPE) and Emotional Intelligence (TMMS-24)

	Attention	Clarity	Repair
Self-efficacy	-.054	.287	.377
Autonomy	.037	.180	.188
Stress tolerance	-.289	.196	.319
Innovativeness	.132	.318	.376
Internal locus	.054	.179	.286
Achievement motivation	.017	.224	.296
Optimism	-.063	.341	.615
Risk-Taking	.059	.216	.265

Socioeconomic Status, academic grades, teacher rating and student self-rating

We calculated the multiple correlation between the eight traits assessed through the BEPE and Socioeconomic Status (R = .126), students' grades in Mathematics (R = .362), and Spanish Language and Literature (R = .513). Furthermore, teachers rated a subsample of 623 students on a scale of 1 to 10 with regard to their entrepreneurial spirit. The multiple correlation between the eight BEPE dimensions and teachers' ratings was .385. Finally, all participants responded on a 5-point Likert-type scale to the following item: *I think I have the necessary ability to run a business in the future*. The multiple correlation between the eight traits of the BEPE and scores on this item was .44

Discussion and conclusions

Entrepreneurial behaviour, like the majority of human activity, is multidimensional in nature and depends on both contextual factors (society, culture, economic situation, etc.) and personal characteristics (abilities, attitudes and personality), as well as on the interaction between these two aspects. Thus, a full understanding of what makes a successful entrepreneur requires in-depth knowledge of all the relevant dimensions. In the present work, we concentrated on the psychological aspects of enterprising people, and more specifically, on personality characteristics. We set out to identify the personality traits most characteristic of enterprising people and to develop a battery of tests for their objective assessment. This perspective focusing on the analysis of the personality traits of enterprising individuals has become consolidated in recent years as one of the foremost psychological approaches to the study of entrepreneurial spirit (Chell, 2008; Hisrich et al., 2007; Rauch & Frese, 2007a, 2007b). Recent reviews in this area (Brandstätter, 2011; Rauch & Frese, 2007a; Zhao et al., 2010) have identified two complementary research lines: on the one hand are those authors who opt to work with classic general personality traits, of the Big Five type; on the other are those who prefer to use traits more closely linked to entrepreneurial behaviour. The two approaches are necessarily complementary, the ultimate goal being to accurately determine the predictive capacity of each one and to analyze the degree of convergence between them. In our study, in an attempt to focus precisely on how the two models intersect, on the one hand, we developed a new battery to assess the specific traits of enterprising personality, and on the other, we assessed the more general traits, contributing fresh data on the relations between the two types of traits.

The first important finding from the study concerns the identification and subsequent empirical confirmation that eight personality traits can be reasonably considered to make up a personality profile of enterprising individuals: achievement motivation, risk-taking, autonomy, self-efficacy, stress tolerance, innovativeness, internal locus of control, and optimism. Both the different scales designed to measure these dimensions, and the BEPE as a whole, show adequate psychometric properties. The reliability coefficients of the scales are over .80, and all present an essentially one-dimensional internal structure. The full battery has a high reliability coefficient (α = .92), and the eight scales make up a single second-order factor that explains 50.32% of the variance. These data support the hypothesis that the enterprising personality constitutes a unitary and consistent dimension, articulated in eight interdependent axes or facets.

One of the important questions to be addressed is the following: to what extent are the specific dimensions we assessed related to the approaches based on general personality dimensions of the Big Five type? The data point to a moderate degree of convergence, given that if the canonical correlation between the two groups is .76, the redundancy coefficient is .24, which indicates that the two perspectives present 24% of common variance. When the variables from the two blocks correlate with each other, the highest correlations are found between optimism and emotional stability (r = .620), stress tolerance and emotional stability (r = .626), and achievement motivation and conscientiousness (r = .608). In the light of these data it can be stated that the two approaches (specific traits and general traits) correlate moderately. More research is needed to continue exploring the predictive capacity of each approach and the extent to which they are complementary.

As regards Emotional Intelligence (EI), the scores on the eight specific dimensions of the BEPE questionnaire tend to converge moderately with the three EI dimensions assessed (Clarity, Repair, Attention). The canonical correlation between the two blocks of variables is .70 and the redundancy coefficient is .16, which would indicate that the two types of variables share just 16% of variance. The highest correlations were found between Optimism and Repair (r = .615), Innovativeness and Repair (r = .376), Self-Efficacy and Repair (r = .377), and Optimism and Clarity (r = .341). As was the case for the general personality traits, EI presents a moderate relationship with the specific personality traits proposed. It would be interesting in future studies to develop a model of enterprising personality that took into account all three types of variables: general traits, specific traits and EI.

As far as socio-economic status is concerned, the eight traits proposed for assessing enterprising personality present a small percentage of common variance with this variable (1.6%). It would not appear, therefore, that socio-economic status is a determining factor in the development of the enterprising personality. These results are in line with those obtained by Stewart, May, and Kalia (2008), who found no relationships between socio-economic variables and entrepreneurial behaviour. Nevertheless, and as various authors have suggested, growing up in an enterprising family context can reinforce personal and social development oriented towards entrepreneurial behaviour (Altinay, Madanoglu, Daniele, & Lashley, 2012; Schroder, Schmitt-Rodermund, & Arnaud, 2011). Nor did we find very high correlations between the eight dimensions of enterprising personality and academic performance: the multiple correlation between these eight dimensions and Mathematics performance was .362, whilst it was .513 for the case of Spanish Language and Literature. The personality dimensions most closely related to academic performance were achievement motivation (r = .23 with Mathematics and r = .24 with Spanish Language and Literature) and autonomy (r = .32 with Mathematics and r = .37 with Spanish Language and Literature). These data point in the direction that the enterprising personality cannot be clearly linked to academic performance, since even though the correlations are positive, they are not high. This aspect is of considerable applied importance, and knowledge about it can help in the design of programmes for education and training in entrepreneurial skills for young people. Another relevant question is whether or not teachers are able to identify those students who show entrepreneurial inclinations. The data seem to suggest that teachers are not very effective when it comes to detecting entrepreneurial students, since the multiple correlation between the eight enterprising personality dimensions and teachers' ratings yielded a value of .385, meaning that teachers only predicted around 13% of enterprising personality in their students. This finding highlights the need for objective measurement instruments to assess enterprising personality, such as the BEPE described in the present study, which could be of help to teachers and counsellors aiming to boost and train their students' entrepreneurial capacity. Finally, students' self-ratings also showed only a modest correlation with the eight personality dimensions assessed, as the associated percentage of variance between the BEPE and the overall self-ratings was just 19%.

To summarize, eight specific personality traits (achievement motivation, risk-taking, autonomy, self-efficacy, stress tolerance, innovativeness, internal locus of control, and optimism) have been identified, allowing us to establish an enterprising personality profile in young people. The BEPE instrument for the reliable measurement of these dimensions was developed, and a range of validity evidence provided. The availability of a measurement instrument of this type will help in the detection of young people with an entrepreneurial bent, and in the design of training initiatives for improving their entrepreneurial abilities, in the line of some programmes that are already up and running (Chandler, DeTienne, McKelvie, & Mumford, 2011; Peterman & Kennedy, 2003; Souitaris, Zerbinati, & Al-Laham, 2007). The data on enterprising personality presented here constitute a small aspect of a much broader research line that attempts to understand entrepreneurial behaviour, and in which variables of a contextual, biographical and cognitive nature play a fundamental role, as well as those related to personality addressed in our study. Notable among the contextual aspects are those associated with culture (Cheng, Cheung, Chio, & Chan, 2012; Lim & Envick, 2013): are there, for example, cultures that reinforce entrepreneurial spirit more than others? From the biographical point of view: how does the family context or atmosphere influence entrepreneurial attitude? And as regards the cognitive domain, there is a need to clarify the role of variables such as intelligence and creativity in entrepreneurial behaviour. There is a great deal still to do in this field, and our challenge for the future is to put all the pieces together and develop comprehensive models that account for entrepreneurial activity, in the line of those proposed by Rauch and Frese (2007a, 2007b).

In appraising the results reported herein, some limitations of the study should be taken into account. First, it must be stressed that the data were obtained via self-reports; in the future, it would be advisable to complement this type of data with information from sources other than the individual him/herself, neurobiological indicators, and/or implicit association instruments, to mention a few possibilities. Furthermore, there is a need to gather more validity evidence (Lane, 2014; Padilla & Benítez, 2014; Ríos & Wells, 2014; Sireci & Faulkner-Bond, 2014) in support of the predictive capacity of the BEPE, and this will be a long process.

Acknowledgments

This research was funded by the Spanish Ministry of Economy and Competitiveness. References: PSI2011-28638, BES2012-053488, IB-05-02, and AP2010-1999.

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3.3. Tercer artículo

Suárez-Álvarez, J., Fernández-Alonso, R., y Muñiz, J. (2014). Self-concept, motivation, expectations, and socioeconomic level as predictors of academic performance in mathematics. *Learning and Individual Differences, 30,* 118-123. doi: 10.1016/j.lindif.2013.10.019.

El objetivo de este artículo es el estudio de la relación entre rendimiento académico (Matemáticas y Ciencias) y tres variables psicológicas (Autoconcepto, motivación y expectativas académicas). Además, se tuvo en cuenta el efecto modulador del índice socioeconómico de los estudiantes. La principal aportación de este artículo a la tesis doctoral es que permite conocer el papel que juegan diferentes variables tanto de carácter psicológico como socioeconómico en el contexto de la adolescencia. La motivación es uno de los rasgos esenciales de la personalidad emprendedora y la percepción de conocimientos y habilidades resulta fundamental para emprender. Por otro lado, el nivel socioeconómico es una de las variables que clásicamente se ha utilizado para explicar la conducta emprendedora. En suma, todo ello permite entender mejor qué papel juegan estas variables en la psicología de los adolescentes. Finalmente, el nivel socioeconómico y el rendimiento académico se utilizarán como evidencias de validez de la Batería de Evaluación de la Personalidad Emprendedora.

Factor de Impacto JCR 2014 = 1,621 ; Q2.

Factor de Impacto 5 años = 2,301

Learning and Individual Differences 30 (2014) 118–123

Contents lists available at ScienceDirect

Learning and Individual Differences

journal homepage: www.elsevier.com/locate/lindif

Self-concept, motivation, expectations, and socioeconomic level as predictors of academic performance in mathematics

Javier Suárez-Álvarez [a,*], Rubén Fernández-Alonso [b], José Muñiz [a]

[a] Universidad de Oviedo, Spain
[b] Department of Education of the Principality of Asturias Government, Spain

ARTICLE INFO

Article history:
Received 31 January 2013
Received in revised form 11 October 2013
Accepted 31 October 2013

Keywords:
Academic performance
Orectic variables
Socioeconomic index
Structural equations

ABSTRACT

The objective of the present work is the study of the relationship between academic performance in two academic disciplines (Mathematics and Sciences) and three variables of an individual nature (Academic Self-Concept, Motivation, and Academic Expectations). In addition, the possible modulating effects of the socioeconomic level of the students were also taken into account. A sample of 7729 students in the second grade of Compulsory Secondary Education in Spain was used. The mean age was 13.78, – SD = .82 –, 52.8% were males. The results allow us to confirm that the variables analyzed present a high and statistically significant correlation with academic performance. The canonical correlation among those four variables and two measures of academic performance is .56. In the structural equations model proposed, 72% of the variance in academic performance is explained. No relevant differences were obtained as a function of student gender.

1. Introduction

Research on the determinants of academic performance can be approached mainly from two perspectives, contextual and personal (Lee & Shute, 2010). From the contextual or sociological perspective, research has basically focused on studying the effect that socioeconomic level has on students' academic performance. After conducting a meta-analysis, Sirin (2005) concludes that there is a medium–high relationship between socioeconomic level and academic performance. However, this author would like to clarify that this relationship is moderated by aspects such as the information source (parents, students or second-hand sources) or the type of measurement performed to assess both socioeconomic level (education, occupation, income, neighborhood, housing, etc.) and academic performance (in general, mathematics, science, etc.). At the same time, the relationship between socioeconomic level and academic performance depends on the level, status and location of the school. The 2009 PISA (*Programme for International Student Assessment*) results indicate a positive association between socioeconomic index and the competences results in all OECD (*Organization for Economic Cooperation and Development*) member countries. In practice, this means a confirmation of this relationship in 34 countries, which represent approximately 80% of the world PIB (OECD, 2010). The implications that can be drawn from these results imply solutions at a social level, and therefore, these relate more to social equity policies than to the individuals themselves.

From a personal perspective, research studies that have attempted to find a connection between personal characteristics and academic performance are organized around two main research lines, one related to cognitive abilities, and another focused on variables of an orectic character, such as attitudes and personality. Within the cognitive perspective, intelligence has become, with almost all certainty, the variable that has played a hegemonic role for the longest time as the great predictor of academic performance (Chamorro-Premuzic, 2007). Nevertheless, despite its clear relationship with performance, it rarely explains about 50% of academic performance (Chamorro-Premuzic & Furnham, 2004; O'Connor & Paunonen, 2007). This implies that more than 50% of the variance is being ignored from a strictly cognitive perspective and could be explained through other variables. The search for other variables related to academic performance has been focused especially on those of an orectic type. Thus, for example, Self-Concept has been shown to be a good predictor of academic performance both in secondary education students (Broc, 2000; Martín-Antón, Carbonero, & Román, 2012) and in university students (Choi, 2005; Gargallo, Garfella, Sánchez, Ros, & Serra, 2009; Guay, Ratelle, Roy, & Litalien, 2010; Huang, 2011), and it can explain differences in academic performance among children with and without learning difficulties (González-Pienda, Núñez, González-Pumariega, Álvarez, & Roces, 2000). Other variables that usually appear connected to academic performance are Motivation (Hornstra, van der Veen, Peetsma, & Volman, 2013; Núñez et al., 2011; Rosário et al., 2012; Steinmayr, Dinger, & Spinath, 2012; Steinmayr & Spinath, 2009), self-efficacy (Beghetto & Baxter, 2012; Sawtelle, Brewe, & Kramer, 2012; Zuffiano et al., 2013), Self-Concept (Chen, Yeh, Hwang, & Lin, 2013; Huang, 2011), or Academic Expectations (Lee, Hill, & Hawkins, 2012; Rosário et al., 2012; Valle et al., 2008).

* Corresponding author at: Psychology Department, University of Oviedo, Plaza Feijoo, s/n, Oviedo 33003, Spain.
E-mail addresses: suarezajavier@uniovi.es (J. Suárez-Álvarez), ruben.fernandezalonso@asturias.org (R. Fernández-Alonso), jmuniz@uniovi.es (J. Muñiz).

1041-6080/$ – see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.lindif.2013.10.019

Nowadays, educational research is focused on how it assesses (Pellegrino, 2012) and how it can improve practice (Mutch-Jones, Puttick, & Minner, 2012). The most promising current approach lies in the creation of comprehensive models; thus, for example, Heaven and Ciarrochi (2012) conclude that intelligence is significantly associated with high academic performance and this effect does not disappear when personality variables are controlled. Along this line, Chamorro-Premuzic and Furnham (2008) propose a structural equation model that explains 40% of the variance in academic performance using the *big five* personality factors and a measure of general intelligence. Similarly, Beghetto and Baxter (2012), propose a path analysis and their results indicate that intellectual risk-taking was positively related to teachers' ratings of science understanding. Results also indicate that students' creative self-efficacy beliefs were positively related to teachers' ratings of math understanding. On their part, Green et al. (2012) propose a longitudinal model of structural equations where self-concept and motivation are significant predictors of attitude toward school, participation in class, doing homework at home, and absenteeism and how all this significantly predicts academic performance.

In contrast, Byrnes and Miller (2007) concluded that socioeconomic status has a direct effect on academic performance, and an indirect effect through other variables that they call opportunity factors (i.e., coursework, teacher variables and school climate) and propensity factors (i.e., aptitude, intelligence, motivation and self-regulation). Chiu and Xihua (2008) conclude that students in families with more resources and fewer competing family members scored higher in mathematics in most countries. Interestingly, these students also scored higher in self-concept and motivation. There is accumulating evidence that even genetic influences on achievement are more pronounced among children living in higher socioeconomic status homes (Lee et al., 2012; Tucker-Drob & Harden, 2012). Therefore, from a psychological point of view, the focus should be on whether the socioeconomic status is a good predictor in itself or because it is associated with emotional variables.

Within this context, in relation to the connection of academic performance with different personality variables of students, in the present research, we will focus on the study of the relationship between two variables of academic performance, Mathematics and Sciences, and three variables of an orectic character: Academic Self-Concept, Motivation and Academic Expectations. The possible effects of the socioeconomic level of the students will also be taken into account.

2. Method

2.1. Participants

The sample was composed of 7729 students enrolled in the second grade of Compulsory Secondary Education (ESO) in the Principality of Asturias, a region situated in northern Spain. Technically, it represents the target population given that the assessment was performed on the whole body of students enrolled in the second grade of Compulsory Secondary Education (ESO) in the 2010–2011 school year in the educational centers of the Principality of Asturias. The participants presented a mean age of 13.78 years and a standard deviation of 0.82; 52% were male and 47.2% female. In addition, 90.6% were Spanish nationals and 9.4% were foreigners. Seventy-nine percent were enrolled in the grade corresponding to their age and 27.1% were behind one or two grades with respect to their age. On the other hand, participants were distributed across a total of 148 educational centers of which 59.4% were public, 37% were state-subsidized, and 2.7% were private.

2.2. Instruments

2.2.1. The academic self-concept scale

Academic self-concept was measured through five items in a scale with a 4-point Likert response format: never or almost never, sometimes, often, and almost always or always. Despite its reduced number of items, it has a high internal consistency ($\alpha = .88$) and is essentially unidimensional, as the first factor explains 68.52% of the item total variance. The items in the Academic Self-Concept Scale are the following: *1*) *I learn the lessons easily*, *2*) *I get good grades*, *3*) *I am a good student*, *4*) *teachers consider me a good student*, *and 5*) *my family considers me a good student*.

2.2.2. The Motivation scale

Motivation was measured through five items in a scale with a 4-point Likert response format: never or almost never, sometimes, often, and almost always or always. Despite its reduced number of items, it has a high internal consistency ($\alpha = .78$) and is essentially unidimensional, given that the first factor obtained explains 53.91% of the total variance of the items. The items that compose the Motivation Scale are: *1*) *I like studying*, *2*) *I work hard to get good grades*, *3*) *in class I make sure I pay attention to the teachers' explanations*, *4*) *I complete my tasks even if they are very hard or take me a long time and 5*) *I am careful that my notebooks and my assignments are neat and tidy*.

2.2.3. The Academic Expectations scale

Student Academic Expectations were assessed by means of a question in which they were asked to consider what type of education they were expecting to achieve: Compulsory Secondary Education (ESO), Post-Compulsory Secondary Education, or University. The option "*I still don't know*" was also provided for those who could not decide between the other previous options. Therefore, a nominal scale of four response categories was used. In order to facilitate its management, it is convenient to modify the scale in such a way that it becomes approximately continuous. To do this, new values were given to the original scale transforming the degree or qualification declared by the student into the number of school years that each title would take. Thus, the students who wished to finish Compulsory Secondary Education would be assigned a 10, those who expected to finish Post-Compulsory Secondary Education a 12 and those who expected to finish University a 15. It was observed that those who did not have clear expectations (vocational indecisiveness) obtained slightly higher scores on the tests compared to those who expected to finish Compulsory Secondary Education; therefore, a value of 11 was assigned in those cases.

2.2.4. Socioeconomic and Cultural Index (SECI)

The Socioeconomic and Cultural Index has been constructed based on the weights estimated in a previous principal components analysis revealing two factors: an economic factor and a cultural factor. The economic index reflects the professional prestige of the mother and father, operationalized in an eight-level scale, as well as the material resources of the home (6 items that include the number of televisions, computers, bathrooms, cars as well as having a landline telephone and dishwasher). On the other hand, the cultural index is composed of the parents' education (years of education) and the number of books in the home (with values of 0, 25, 100, 200, and 500) as well as the family cultural and material resources (i.e., 8 items that determine whether they have a place for studying, a desk, dictionaries, calculator, computer, software, internet and newspapers). In order to ensure the maximum objectivity, we asked the schools to provide the profession and studies of the parents, and the rest of the aspects were assessed with questionnaires completed by the students. The construction of the SECI is conducted by weighing each of these indicators by their factorial weights; for a detailed description, see Peña-Suárez, Fernández-Alonso, and Muñiz (2009).

2.2.5. Academic performance measurement

Academic performance was measured through two tests that assess competences in Mathematics and Sciences. The description of the test content can be found in the Government of the Principality of Asturias (2011). An item bank was created which was purified through a pilot study and following the protocol established by Fernández-Alonso

(2005). Finally, 192 items were selected (96 for each competence assessed). There were three item formats used: multiple choice, short open-ended answer, and essay. Given that the group of items was constructed to measure two competences (Mathematics and Sciences), the item bank was adjusted to a two-dimensional item response model. It was assumed that each item saturated in one and only one of the dimensions, for which a two-dimensional model among items was chosen (*multidimensional between-item tests*). The fitting of the bank was conducted with the ConQuest 2.0 program (Wu, Adams, Wilson, & Haldane, 2007). For the initial calibration of items, 2000 subjects were selected from the total sample. This ensured that each item was responded to by 500 subjects. Once the adjustment of the items to the model was checked, the parameters of these were estimated. These parameters were employed as initial values to calculate the score of the subjects on each competence in function of the response to the items. Finally, the original scores were transformed on a scale with a mean of 500 and a standard deviation of 100. The difficulty indexes of the tests comprise the entire possible rank of scores, both easy items and difficult items, although most of them (around 40%) were concentrated on the middle range of the distribution of difficulty. The mean Cronbach's alpha coefficient for the 8 booklets used in the application was .85 (with a mean value of .82 and a maximum of .88).

2.3. Procedure

The application of the test was conducted within the educational system assessment program of the Principality of Asturias. This program was developed according to *Organic Law 10/2002 of the 23rd of December* regarding the Quality of Education, which is the responsibility of the Ministry of Education, Culture and Sport of the Government of the Principality of Asturias. The program establishes that the application of questionnaires and tests is to be conducted by active service teachers at the educational centers. In this context, the administrative teams at the educational centers are in charge of managing the entire process: informing the educational community of the objective and importance of the tests, assigning the persons in charge of their application, safe keeping of the tests until the time of application, as well as of internal control coordination. The General Diagnostic Evaluation tests in Asturias 2011 were applied by teachers assigned by the centers' administrative teams in all cases. The specific guidelines for the application of the tests were provided in the *Protocol for the development of the Diagnostic Evaluation* in the corresponding section in the booklet of each competence. The duration of the context questionnaire (which included Self-Concept, Expectations, Motivation and SECI scales) was half an hour. The total of 192 items (96 per competence) corresponding to the tests would account for 8 h of evaluation. In order to make the administration of the test viable, items were distributed in 8 different booklets. Each booklet contained 48 items (24 per competence) and was responded to in two 40-minute sessions separated by a break. The design of the booklets is partially balanced incomplete blocks. Specifically, the matrix design used was a partially balanced simple lattice. For more details about the design, see Fernández-Alonso and Muñiz (2011).

Table 1
Correlation matrix between the variables.

	Sciences	Mathematics	Self-Concept	Motivation	Expectations
Sciences					
Mathematics	.66				
Self-Concept	.43	.49			
Motivation	.23	.29	.66		
Expectations	.28	.33	.41	.35	
SECI*	.30	.33	.31	.21	.26

Note. * Socioeconomic and Cultural Index.

Table 2
Partial correlation matrix taking into account the influence of Socioeconomic and Cultural Index.

	Sciences	Mathematics	Self-Concept	Motivation
Sciences				
Mathematics	.62			
Self-Concept	.36	.43		
Motivation	.18	.24	.64	
Expectations	.22	.26	.36	.32

2.4. Data analysis

With the aim of studying the relationship the variables may have with academic performance, the correlation matrix and partial correlation matrix (controlling the SECI) between all predictor and dependent variables was obtained. Thus, the percentage of explained variance and standardized beta weights of each variable was calculated through multiple regressions and the percentage of improvement in academic performance as a function of the studied variables. In order to test the academic performance model proposed, a confirmatory factor analysis with crossed validation was performed. With this aim, the sample was randomly divided into two equivalent parts (by means of the SPSS 15.0 subroutine) in order to perform crossed validation on the hypothesized model (N1 = 3828; N2 = 3901). In the first sample, a confirmatory factor analysis of the proposed model was conducted, and the measurement errors were correlated with the intention of reflecting the constructs that are being measured in a more realistic manner (Byrne, 2001). In the second sample, with the aim of validating the model, another confirmatory factor analysis was performed on the model re-specified in the first sample but this time without modifying anything. The estimation method employed in both cases was the Robust Maximum-Likelihood for being the one that had a better fit to the data. In addition, the fit of the model to the data according to different criteria was analyzed: the *Comparative Fit Index* (CFI), the *Tucker–Lewis Index* (TLI), the *Root Mean Square Error of Approximation* (RMSEA) and the *Standardized Root Mean Square Residual* (SRMR). Finally, a *t* test was conducted to study the model variables as a function of gender and the effect size of these differences was studied. Following the procedure established by Fernández-Alonso, Suárez-Álvarez, and Muñiz (2012), the missing values have been replaced by the subject's mean on the subscale when the value was incomplete and by multiple imputation (EM algorithm) when the value was completely lost. Data were analyzed with SPSS 15.0 (SPSS, 2006), Mplus 5 (Muthén & Muthén, 1998–2007), and *ConQuest 2.0* (Wu et al., 2007).

3. Results

Table 1 presents the correlation matrix between all variables. As can be observed these range from .21 to .66. The partial correlations when the SECI is controlled are presented in Table 2. The correlation between variables decreases when the effect of the SECI is eliminated.

Multiple regression (Table 3) indicates that the group of orectic variables, as well as the SECI, explains between 23 and 30% of the variance of the performance variables (Mathematics and Sciences). Likewise, it

Table 3
Multiple regression of the predictor variables of academic performance.

$R^2 = .295$	Mathematics		$R^2 = .227$	Sciences	
	Beta	Sig.		Beta	Sig.
Intercept	295.857	.001	Intercept	327.819	.001
Self-Concept	0.433	.001	Self-Concept	0.397	.001
SECI*	0.181	.001	SECI*	0.173	.001
Expectations	0.129	.001	Expectations	0.107	.001
Motivation	−0.075	.001	Motivation	−0.105	.001

Note. * Socioeconomic and Cultural Index.

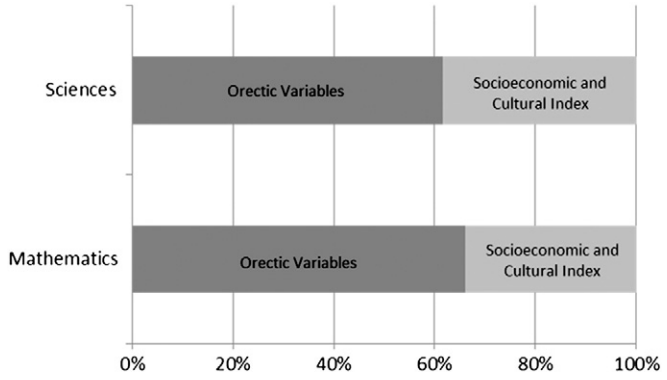

Fig. 1. Percentage of prediction in the performance tests based on the remaining variables.

Table 4
Canonical correlation among academic performance and the other variables.

		Weights	Canonical corr.
Orectic variables	Self-Concept	−0.90	.56
	Motivation	−0.52	
	Expectations	−0.60	
	SECI*	−0.62	
Academic performance	Sciences	−0.96	
	Mathematics	−0.84	

Note. * Socioeconomic and Cultural Index.

can be observed that the greatest weight of these variables in the prediction corresponds to Self-Concept, the SECI, Expectations and Motivation, in this order. As can be seen, the high collinearity between Self-Concept and Motivation seems to have generated negative weights in the regression for the latter. In any case, all variables are statistically significant ($p < .001$) and increase R^2 when they are all introduced into the regression.

From the regression weights, a medium percentage of improvement in performance test is estimated in function of the predictor variables. That is, the points of improvement with respect to a base profile are calculated for having medium Self-Concept, Motivation, Expectations and SECI. As can be seen in Fig. 1, both in Mathematics and in Sciences, the percentage of improvement was greater for the orectic variables (Self-Concept, Motivation and Expectations) than for the sociological antecedent (SECI).

On the other hand, the canonical correlation among the predictor variables of the model (Self-Concept, Motivation, Expectations and SECI) and the dependant variables (Sciences and Mathematics) is .56. As can be observed in Table 4, the predictor variable that has the greatest weight in the canonical correlation is Self-Concept, followed by the SECI, Expectations and Motivation.

In the model, the measurement errors have been correlated with the intention of showing the existing relationship between the studied dimensions in a more realistic manner. The reason for this is that, as defended by Byrne (2001), social and psychological research items of a same dimension or of related dimensions are usually correlated and, in essence, it makes sense to include these in the model. The goodness-of-fit assessment of the data for the two sample halves are presented in Table 5. As can be seen, the CHI-2 index is statistically significant (probably due to the sensitivity of the statistic to the sample size). Hu and Bentler (1999) suggest that the CFI and the TLI indexes should be higher than .95, the RMSEA should be below .06 and the SRMR below .08. According to these indexes, it can be asserted that the fit of the model to the data is excellent, and therefore, it allows us to confirm the proposed model.

In Fig. 2, the structural equation model for academic performance is presented. After checking its good fit to the data, the model comprises a factor denominated "*orectic variables*" composed of Self-Concept, Motivation and Expectations, modulated by the SECI, and a factor called "*academic performance*" composed of the scores on Sciences and Mathematics. As can be observed, the SECI explains around 23% ($R^2 = .48^2$) of the variance in the "*orectic variables*" factor. At the same time, all this explains 72% ($R^2 = .85^2$) of the "*academic performance*" factor.

Finally, the differences across gender in all variables in the model are presented. All these, except for the SECI, present statistically significant differences as a function of gender at the 95% confidence level. These differences favor men in the scores on Sciences and Mathematics and favor women in the orectic factor variables. However, the magnitude of the effect size according to the g of Hedges (1982) is small or practically null in all cases. Following Cohen's (1988) interpretation on the magnitude of the effect size, in this case the null hypothesis is false to a very small degree; thus, the differences found in Mathematics and Self-Concept, although significant, would not be relevant. However, the differences found in Sciences, Motivation and Expectations, in addition to being significant, would present moderate effect sizes (Table 6).

4. Discussion and conclusions

The relationship between three orectic-type variables (Self-Concept, Motivation and Expectations) and one variable of a socioeconomic character (Socioeconomic and Cultural Index) with academic performance in Mathematics and in and Sciences was studied. To assess the socioeconomic level, we constructed an index that synthesizes the students' socioeconomic and family context data. This index is made up of a cultural factor and an economic factor (Peña-Suárez et al., 2009) and serves as an indicator of the sociocultural antecedents of the families with regard to academic performance (Byrnes & Miller, 2007; OECD, 2010). To minimize the risks of using not very reliable information sources (Sirin, 2005), the schools provided the information about the parents' profession and studies.

It was found that all variables had a high and statistically significant correlation with academic performance. The variable with the highest predictive power was academic Self-Concept, followed by Socioeconomic level (SECI), Expectations and Motivation. These results confirm the findings about the predictive value of these variables for academic performance (Guay et al., 2010; Lee et al., 2012; OECD, 2010; Tucker-Drob & Harden, 2012). However, it is important to underline that the highest correlations were found between self-concept and academic performance. Moreover, even when eliminating the influence of Socioeconomic and Cultural Index, the correlations are high ($r_{xy.z} > .35$). This means that for the same socioeconomic level, people with a better self-concept obtain better scores in academic performance. Therefore, in spite of the importance of the sociocultural antecedents (Byrnes & Miller, 2007; Chiu & Xihua, 2008; Lee et al., 2012; Tucker-Drob &

Table 5
Fit indexes of the model to the data through cross validation.

CHI-2 (DF)		CFI		TLI		RMSEA (IC)		SRMR	
N1	N2	N1	N2	N1	N2	N1	N2	N1	N2
28,73(5) p < .001	19,87(5) p < .001	.99	.99	.99	.99	.035 (.023;.048)	.028 (.016;.041)	.011	.009

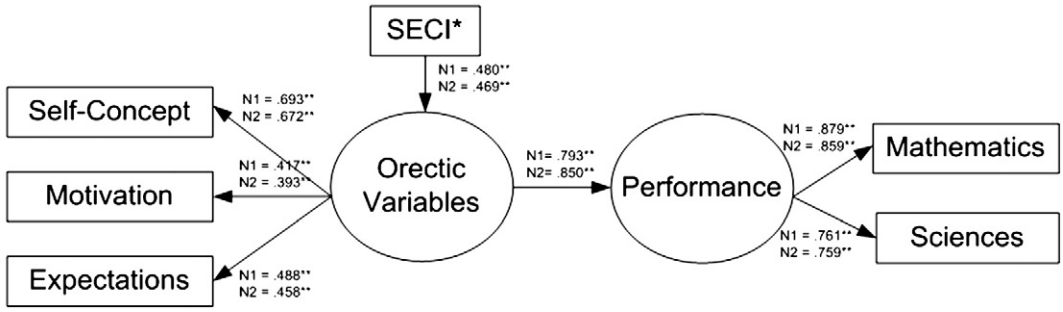

Fig. 2. Structural equation model for academic performance prediction.

Harden, 2012), the emotional variables appear to play a more decisive role in academic performance.

The proposed structural equations model (Fig. 2) takes a factor denominated "orectic variables" (Self-Concept, Expectations and Motivation) as the academic performance predictor, which is mediated by the Socioeconomic and Cultural Index, explaining up to 72% of the variance in the scores on the "Performance" factor (Mathematics and Sciences). These results provide a very high predictive power of academic performance, clearly superior to the results obtained in the previous literature. Note that by contrast, for example, intelligence does not even explain 50% of academic performance (Chamorro-Premuzic & Furnham, 2004; O'Connor & Paunonen, 2007), even when the *big five* personality traits are included (Chamorro-Premuzic & Furnham, 2008).

Orectic variables seem to have a greater weight in the prediction of academic performance than the socioeconomic antecedents. The improvement that these variables offer on academic performance is 6 or 7 out of every 10 points, as opposed to 3 or 4 points of the Socioeconomic and Cultural Index. This fact may have clear implications for policy makers, educational centers and families given the potential for improvement if these individual aspects are worked on. In sum, interventions on variables such as Academic Self-Concept, Motivation and Expectations of students can be of great relevance for the improvement of student academic performance (Lozano et al., 2011). Naturally, equity policies aimed at balancing the socioeconomic conditions of students will act as an empowering factor in interventions on the cited aspects.

Acknowledgments

This investigation has been funded by the University of Oviedo (Project: UNOV-11-BECDOC), and by the Spanish Ministry of Science and Innovation (Project: PSI2011-28638).

We would like to express our utmost gratitude to the Government of the Principality of Asturias (Spain), without whose collaboration this research would not have been possible.

Table 6
Differences across gender in all studied variables.

	Mean (S.D.)		t	p	Hedges's g
	Men	Women			
Sciences	507.25 (97.12)	487.31 (92.53)	9.24	.001	.21
Mathematics	499.73 (97.53)	494.76 (93.94)	2.28	.023	.05
Self-Concept	1.61 (0.76)	1.67 (0.82)	−3.10	.002	−.07
Motivation	1.69 (0.65)	1.92 (0.62)	−15.78	.001	−.36
Expectations	12.83 (2.22)	13.38 (2.10)	−11.11	.001	−.25
SECI*	12.39 (3.54)	12.28 (3.53)	1.33	.185	.03

Note. * Socioeconomic and Cultural Index.

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Javier Suarez-Alvarez is a Graduate Student in Psychometrics at the University of Oviedo (Spain). Recently, he has published papers on *missing values* and *professional training*.

Rubén Fernández-Alonso is a PhD in Psychometrics, and specialized on Educational Measurement. He has published papers on *missing values*, and *booklet designs* for educational diagnostic evaluation.

Jose Muñiz is a professor of Psychometrics at the University of Oviedo, Spain. He has published numerous books and papers in national and international journals. He has been president of the International Test Commission (ITC), and the European Association of Methodology (EAM). A Fulbright grant allowed him to work at the University of Massachusetts (Amherst) with Profs. Ronald K. Hambleton and Steve Sireci.

3.4. Cuarto artículo

Pedrosa, I., Suárez-Álvarez, J., Lozano, L.M., Muñiz, J., y García-Cueto, E. (2014). Assessing perceived emotional intelligence in adolescents: New validity evidence of Trait Meta-Mood Scale–24. *Journal of Psychoeducational Assessment, 32*(8), 737-746. doi: 10.1177/0734282914539238.

El objetivo de este artículo es proporcionar nuevas evidencias de validez del *Trait Meta-Mood Scale-24* para evaluar inteligencia emocional en población española adolescente. La principal aportación de este artículo a la tesis doctoral es la confirmación de que se dispone de un instrumento de medida con adecuadas propiedades psicométricas para evaluar adolescentes españoles. La inteligencia emocional es una de las variables incluidas en el modelo de evaluación de la personalidad emprendedora. El *Trait Meta-Mood Scale-24* se utiliza para estudiar las evidencias de validez convergente de la Batería de Evaluación de la Personalidad Emprendedora.

Factor de Impacto JCR 2014 = 1,054 ; Q3.

Factor de Impacto 5 años = 1,612

Journal of Psychoeducational Assessment
2014, Vol. 32(8) 737–746

DOI: 10.1177/0734282914539238
jpa.sagepub.com
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Assessing Perceived Emotional Intelligence in Adolescents: New Validity Evidence of Trait Meta-Mood Scale–24

Ignacio Pedrosa[1], Javier Suárez-Álvarez[1], Luis M. Lozano[2], José Muñiz[1,3], and Eduardo García-Cueto[1]

Abstract

Adolescence is a critical period of life during which significant psychosocial adjustment occurs and in which emotional intelligence plays an essential role. This article provides validity evidence for the Trait Meta-Mood Scale–24 (TMMS-24) scores based on an item response theory (IRT) approach. A sample of 2,693 Spanish adolescents (M = 16.52 years and SD = 1.38), of whom 51.1% were boys, completed the TMMS-24. The three-dimensional structure of the TMMS-24 was confirmed, showing adequate psychometric properties for assessing adolescents. With one exception, the IRT analyses showed that the items have a reasonable fit to Samejima's Gradual Response Model. In addition, all three dimensions exhibit the best measurement precision around the mean of the latent trait levels. Again, with one exception (Item 23), all items have a moderate to very high discrimination power.

Keywords

item response theory, differential item functioning, adolescents, perceived emotional intelligence, TMMS-24, validity

Emotional intelligence (EI) refers to the mental processes involved in recognizing, using, understanding, and managing one's and others' emotional states when coping with problems and regulating behavior (Mayer & Salovey, 1997). Adolescence is a critical period of life in which the ability to express and understand emotions is particularly important in social and psychological adjustment (Mavroveli, Petrides, Rieffe, & Bakker, 2007; Peña-Fernández, Andreu-Rodríguez, Barriga, & Gibbs, 2013). To manage emotion in an appropriate way, especially in adolescents, EI plays an important role (Mayer, Perkins, Caruso, & Salovey, 2001). Previous research has shown that adolescents with better developed EI show greater social support and use more effective coping strategies, which in turn, modulate the effects on academic performance, well-being, and life satisfaction (Austin, Saklofske, & Mastoras, 2010; James, Bore, & Zito, 2012; Keefer, Parker, &

[1]University of Oviedo, Spain
[2]University of Granada, Spain
[3]Center for Biomedical Research in the Mental Health Network (CIBERSAM), Madrid, Spain

Corresponding Author:
Ignacio Pedrosa, Faculty of Psychology, University of Oviedo, Pz/ Feijóo, s/n. Office 4, 33003, Oviedo, Spain.
Email: npedrosa@cop.es

Wood, 2012; Saklofske, Austin, Mastoras, Beaton, & Osborne, 2012). EI can be considered a part of personality (Russo et al., 2012; Watson, 2000) but still leaving a good amount of variance unique to EI (Saklofske, Austin, & Minski, 2003).

The different conceptualizations and definitions of EI have resulted in a range of measurement instruments (James et al., 2012); among them, the Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Paarfay, 1995) is one of the most widely used (Gorostiaga, Balluerka, Aritzeta, Haranburu, & Alonso-Arbiol, 2011). The TMMS was designed to assess individual differences in the process of emotional regulation and addresses three key aspects of EI: emotional attention, emotional clarity, and emotional repair.

Although EI scales have received wide use, more empirical data about their psychometric properties are required, especially when these scales are adapted, translated, and then used in different countries (Li, Saklofske, Bowden, Fung, & Yan, 2012). Previous research conducted with the TMMS with Spanish participants reports high reliability coefficients, ranging from .82 to .90 for the general population (Fernández-Berrocal, Extremera, & Ramos, 2004; Salovey et al., 1995), and moderate values in adolescents, with alpha coefficients between .68 and .86 (Díaz-Castela et al., 2013; Extremera, Durán, & Rey, 2007; Fernández-Berrocal, Alcaide, Extremera, & Pizarro, 2006; Gorostiaga et al., 2011; Salguero, Fernández-Berrocal, Balluerka, & Aritzeta, 2010). Moreover, the instrument has shown adequate convergent and discriminant validity (Fernández-Berrocal et al., 2004). In the field of EI, the application of advanced psychometric methods such as item response theory (IRT) is rare and thus, some cause for concern among researchers and clinicians (Matthews, Zeidner, & Roberts, 2007). There is little published work to which IRT has contributed (Cooper & Petrides, 2010). The work done with the TMMS has been based on classical test theory (CTT). Nonetheless, psychometric technology based on IRT models has many advantages when compared with the classical approach (Hambleton & Jones, 1993). IRT, through its item level analysis, both establishes the probability of a participant endorsing an item and allows the comparison of scores from different participants in different measurement instruments. Therefore, this approach provides an invariant metric with respect to the evaluated sample and the instruments used for whatever end (De Ayala, 2009; Hambleton, Swaminathan, & Rogers, 1991).

Within the IRT framework, the Graded Response Model (GRM; Samejima, 1969) provides Information Functions for each item (Item Information Function; IIF), and for the global test (Test Information Function; TIF). The IIF indicates the measurement precision of an item across different levels of the trait being measured, whereas the TIF indicates the measurement precision of the test across different levels of the measured trait. This information is much more detailed than reliability coefficients based on CTT. So bearing in mind IIF and TIF, it is possible to understand both the precision of the scale for each trait level, and which items are most appropriate to apply to each person. In addition, IRT allows the estimation of discrimination (*a*-parameter) and threshold (*b*-parameter) parameters of the items.

Differential item functioning (DIF) of TMMS items will be analyzed in detail. DIF occurs when examinees from different groups show differing probabilities of success on (or endorsing) the item after matching on the underlying trait that the item is intended to measure (Gomez-Benito, Hidalgo, & Zumbo, 2013). For this reason, studying DIF has a special relevance when it comes to investigations where measurement invariance is evaluated. So, if one of the items presents DIF and it has not been detected previously, the conclusions obtained from the measurement invariance analyses may be biased. The two types of existing DIF are termed uniform and non-uniform (Mellenbergh, 1982). Uniform DIF occurs when there is no interaction between the trait level and being part of a group, that is to say, when the probability of endorsing a certain item is uniformly greater for one of the groups throughout the different trait levels. Non-uniform DIF, however, is present when there is an interaction between trait level and group, that is, the difference in the probability of endorsing an item is not the same for all trait levels.

Although there are many psychometric advantages offered by IRT, the TMMS have not been systematically investigated to date using these newer psychometric tools. The main purpose of this article is to obtain new validity evidence for the Spanish version of the TMMS-24 (Fernández-Berrocal et al., 2004) scores using IRT in a community sample of Spanish adolescents.

Method

Participants

Participants were 2,693 adolescents (of whom 51.1% were boys) recruited from 22 schools of three autonomous communities located in the North of Spain. Ages ranged from 14 to 23 years, with a mean age of 16.52 (*SD* = 1.38). The sample was from secondary schools, with 34.20% in their final year of compulsory secondary education, 57.90% doing A Levels and 7.80% undergoing vocational training.

Once the test was administered, only 0.4% of data were identified as missing. Given that the magnitude of missing data was so small, it was handled using the listwise deletion method (Fernández-Alonso, Suárez-Álvarez, & Muñiz, 2012).

Measure

EI was assessed with the standard Spanish adaption of the TMMS-24 (Fernández-Berrocal et al., 2004). The questionnaire consists of three subscales: *attention* (eight items; $\alpha = .89$), which assesses the amount of attention paid to one's own emotional state; *clarity* (eight items; $\alpha = .83$), which evaluates the understanding of one's emotional state; and *emotional repair* (eight items; $\alpha = .78$), which refers to the ability to regulate one's emotional state. Participants rate the extent to which they agree on a 5-point Likert-type scale where 1 means *strongly disagree* and 5 *strongly agree*. High scores for repair and clarity dimensions indicate appropriate levels in both dimensions whereas high scores on attention implies excessive attention to feelings, something that should be improved on.

Procedure

Participation was voluntary, and no incentives were provided. Data were collected in the classrooms provided by the schools. Psychologists trained in the use of measurement instruments administered the tests.

Data Analyses

First, to analyze the factorial structure of TMMS-24 a confirmatory factor analysis (CFA) was conducted on the total sample. Second, the sample was divided by sex, and a CFA was carried out on each of the subsamples to analyze the robustness of the three-factorial structure by sex through a cross-validation process (Browne, 2000; Rios, & Wells, 2014). In all cases, the Robust Maximum-Likelihood Method was selected because of the non-normality of the distributions and analyzed using the Saphiro–Wilk normality test. As the TMMS-24 states, a three-dimensional structure was proposed in all cases. Goodness-of-fit to the sample data was determined by means of the following indices: χ^2 likelihood ratio divided by the degrees of freedom (χ^2/df), comparative fit index (CFI), and root mean square error of approximation (RMSEA). Byrne (2001) suggested that for a good fit to the model, the CFI should be higher than .95, the RMSEA lower than .06, and the value of the χ^2/df ratio lower than 2. Moreover, interfactor correlations were calculated.

The DIF was analyzed through logistic regression. Each subscale was analyzed independently and the matching criterion was purified in the process of conducting the DIF analysis. Ordinal Cronbach's coefficients of the subscales of TMMS-24 were estimated (Elosua & Zumbo, 2008).

In the framework of IRT, the Samejima's (1969) GRM was used, applying three separate models for each TMMS-24 subscale. Analysis of the standardized residual errors of the 24 items of the TMMS-24 was carried out. Moreover, the IFs were calculated for the three subscales of the TMMS-24, and the parameters and IFF were estimated for each of the 24 items. Interfactor correlations were calculated in this case too.

The statistical analyses were carried out using SPSS 19.0, Mplus 5.1, and Multilog 7.03.

Results

Construct Validity and Robustness of the Construct by Sex in Adolescents

As can be seen in Table 1, the three-dimensional structure of TMMS-24 was confirmed in the full sample and separately for male and female groups. The factorial loadings of the three subscales, for the three subsamples were between .44 and .84, except Item 23, which had values of .19, .22, and .18 in the full sample, the male group, and the female group, respectively. These results follow the same pattern when the item discrimination indices for the full sample, the male group, and the female groups are analyzed. All of the values are above .38 except, again, Item 23, which has discrimination indices of .21 (total and girls) and .23 (boys).

Interfactor correlations obtained for both the whole sample and the subsamples of boys and girls are shown in Table 2.

DIF

The DIF in relation to sex was analyzed through the logistic regression method, and it can be observed that several items exhibited DIF from a statistically significant perspective (see Table 3). However, when analyzing such a large sample, statistical testing of DIF alone might provide misleading information (Kim, Cohen, Alagoz, & Kim, 2007). Taking the effect size into account, only one of the items exhibited more than negligible DIF: Item 23 shows uniform DIF, where girls more often endorsed this item than boys, irrespective of their standing on the latent trait.

IRT Analysis

An examination of the standardized residual errors of the 24 items of the TMMS-24 showed that approximately 90% of the residuals were found within limits ($-3 < r < 3$) that indicate a good fit of the data to the model, and thus, it may be concluded that all of the items fit the model (Liang, Han, & Hambleton, 2008).

Parameters a and b for each item on the scales of the TMMS-24 showed that except for one, all items have a moderate to very high discrimination power (see Table 4). Half of the items exhibit a very high discrimination, with most of the best discriminating items belonging to the emotional attention dimension. The b-parameters shown in Table 4 reach, in most cases, relatively low to moderate values. When using Samejima's GRM, the number of b-parameters is one less than the number of alternatives for that item. As there are five alternatives for the items in the TMMS-24, there are four values of b for each item. The b-parameter indicates, for a given level of the trait (θ), the probability of selecting a specific response category or higher. This means that the probability of choosing the first category or higher will always be 1, not including the corresponding b for this category of response. However, the difference between the values of these parameters ($b_4 - b_1$) can be interpreted as an indicator of the ease with which a person may change his or her response from one category to another. To put it another way, if the differences

Table 1. Factorial Structure of TMMS-24 in Spanish Adolescents.

	Sample size	χ^2/df	CFI	RMSEA [CI]
Total	2,693	5.84	.93	.042 [.040, .044]
Boys	1,372	3.07	.93	.039 [.036, .042]
Girls	1,316	3.39	.93	.043 [.040, .046]

Note. Some of the participants did not record their sex. TMMS-24 = Trait Meta-Mood Scale–24; CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = 90% confidence interval.

Table 2. Interfactor Correlations for the Confirmatory Factor Analysis.

	Total	Boys	Girls
$r_{\text{clarity–attention}}$	.404	.418	.411
$r_{\text{repair–attention}}$	.062	.100	.051
$r_{\text{clarity–repair}}$	.369	.364	.380

Note. r = Pearson correlations.

Table 3. DIF and Effect Size of the TMMS-24 Items.

Item	χ^2_{M3-MI} (p)	R^2_{M3-MI}	R^2_{M2-MI}	R^2_{M3-M2}
1	85.77 (<.001)	.022	.022	−.001
6	35.38 (<.001)	.009	.009	.001
8	36.00 (<.001)	.006	.006	.001
11	65.34 (<.001)	.014	.014	.000
13	69.05 (<.001)	.020	.019	.001
14	24.92 (<.001)	.005	.004	.000
15	12.76 (<.001)	.003	.003	.001
17	42.37 (<.001)	.010	.001	.000
22	15.57 (<.001)	.005	.005	.000
23	83.86 (<.001)	**.040**	**.044** (p<.001)	−.004 (p=.244)

Note. DIF = differential item functioning; TMMS = Trait Meta-Mood Scale–24; χ^2_{M3-MI} = statistical test of logistic regression; R^2_{M3-MI} = global effect size; R^2_{M2-MI} indicates uniform DIF; R^2_{M3-M2} reports non-uniform DIF.

between b values are small, it means that there is a similar probability of choosing any of the response categories. And so, there is a big chance that in the future, a person may change his or her response from one category to another. In contrast, as these differences grow, the probability of choosing a different category of response shrinks and so a change becomes less probable. Understanding b_4–b_1 differences can be a great help in applied contexts when planning the possibility of carrying out a clinical intervention to improve aspects of people's EI. It would be easier to change the response when b_4–b_1 difference is smaller. In contrast, a change is more unlikely when trying to modify aspects covered by items with a larger b_4–b_1 difference. To sum up, the difference between the b-parameters of an item gives an indication of the possible benefits of an intervention designed to change aspects of EI that are deficient in a specific population. Subsequently, the largest differences ($b_4 - b_1$) for the items of the EI questionnaire were found in the emotional repair subscale, and the smallest differences correspond to the emotional attention subscale. According to the previous explanations, this means that it would be easier to change the subjects' responses for emotional attention than for emotional repair.

To further explore the measurement precision of the TMMS-24, the IF, representing the accuracy and the standard measurement error, was estimated for each dimension. In general,

Table 4. IRT Parameter Estimates for TMMS-24.

Items	a	b_1	b_2	b_3	b_4	$b_4 - b_1$
Emotional attention						
1. I pay much attention to my feelings	1.41	−3.53	−2.16	−0.76	0.84	4.37
2. Usually I care much about what I'm feeling	1.60	−3.06	−1.82	−0.47	0.93	3.99
3. It is usually a waste of time to think about your emotions	1.76	−1.83	−0.70	0.31	1.51	3.34
4. I think it's worth paying attention to your emotions or mood	1.84	−2.90	−1.81	−0.50	0.79	3.69
5. I let my feelings interfere with what I am thinking	1.13	−2.58	−1.19	0.29	1.90	4.48
6. I think about my mood constantly	1.81	−1.42	−0.34	0.76	1.84	3.26
7. I often think about my feelings	3.40	−1.70	−0.82	0.11	1.01	2.71
8. I pay a lot of attention to how I feel	3.09	−1.93	−0.90	0.13	1.21	3.14
Emotional clarity						
9. I am usually very clear about my feelings	1.19	−3.28	−1.82	−0.49	0.97	4.25
10. I am rarely confused about how I feel	1.75	−2.23	−1.09	0.23	1.68	3.91
11. I usually know my feelings about a matter	1.67	−2.71	−1.39	−0.12	1.25	3.96
12. I can make sense out of my feelings	1.49	−3.35	−2.03	−0.48	1.29	4.64
13. I am often aware of my feelings on a matter	1.02	−4.12	−2.35	−0.24	1.76	5.88
14. Always I can tell how I feel	1.89	−1.93	−0.80	0.26	1.49	3.42
15. Sometimes I can tell what my feelings are	1.66	−2.86	−1.56	−0.15	1.38	4.24
16. I almost always know exactly how I am feeling	1.97	−2.66	−1.48	−0.15	1.14	3.80
Emotional repair						
17. Although I am sometimes sad, I have mostly optimistic outlook	1.39	−2.43	−1.25	−0.22	1.08	3.51
18. No matter how badly I feel, I try to think about pleasant things	2.07	−2.50	−1.44	−0.24	1.17	3.67
19. When I am upset, I think of all the pleasure of life	1.14	−2.04	−0.67	0.57	1.87	3.91
20. I try to think good thoughts no matter how badly I feel	2.16	−2.19	−1.28	−0.21	0.97	3.16
21. If I find myself getting mad, I try to calm myself down	0.84	−3.78	−2.19	−0.11	2.10	5.88
22. I worry about being in too good mood	1.03	−4.17	−2.79	−0.86	1.20	5.37
23. I have much energy when I am happy	0.64	−8.81	−7.03	−4.18	−1.21	7.60
24. When I am angry I don't usually let myself feel that way	1.27	−2.95	−1.65	−0.22	1.43	4.38

Note. The standard Spanish adaption of the TMMS-24 can be freely downloaded from the authors' web page: http://www.unh.edu/emotional_intelligence/EI%20Assets/Reprints…Mood%20Meas%20and%20Mood%20Cong/TMMS24%20con%20referencias%202007.pdf.

IRT = item response theory; TMMS = Trait Meta-Mood Scale–24; a = discrimination parameter; b_1, b_2, b_3, b_4 = b-parameters.

all three IFs exhibit maximum information between −2 and +1 trait levels, showing the best measurement precision around the mean of the trait levels. The three scales reduce their accuracy around the highest levels of the trait, especially in individuals with a latent trait level above +2.

Table 5 shows item information values for the TMMS-24, where some of the items had uniformly low IIF values across the latent trait range; however, many other items had moderate to high IIF values.

In addition, the interfactor correlations from the trait levels of the participants on the three dimensions of the TMMS-24 are as follows: $r_{\text{clarity–attention}} = .373$, $r_{\text{repair–attention}} = .076$, and $r_{\text{clarity–repair}} = .269$. As expected, these interfactor correlations are very similar to those calculated in the CFA (Table 2).

Table 5. Item and Test Information Functions for the TMMS-24.

	Estimated trait						
Items	−3.0	−2.0	−1.0	0	1.0	2.0	3.0
Emotional attention							
1	0.46	0.52	0.50	0.39	0.48	0.11	0.01
2	0.66	0.66	0.54	0.54	0.64	0.13	0.01
3	0.09	0.74	0.75	0.78	0.66	0.47	0.03
4	0.84	0.85	0.64	0.65	0.76	0.07	0.00
5	0.28	0.33	0.35	0.34	0.31	0.32	0.12
6	0.02	0.40	0.75	0.77	0.82	0.78	0.09
7	0.01	1.47	2.33	2.66	2.91	0.04	0.00
8	0.03	2.31	2.26	2.17	1.84	0.15	0.00
Emotional clarity							
9	0.37	0.38	0.37	0.37	0.36	0.14	0.02
10	0.26	0.76	0.79	0.73	0.51	0.62	0.06
11	0.59	0.56	0.63	0.71	0.66	0.26	0.02
12	0.54	0.58	0.46	0.44	0.51	0.27	0.03
13	0.25	0.26	0.22	0.27	0.23	0.25	0.10
14	0.11	0.90	0.88	0.87	0.69	0.49	0.03
15	0.67	0.60	0.53	0.68	0.58	0.35	0.03
16	0.71	0.74	0.68	0.95	0.95	0.20	0.01
Emotional repair							
17	0.32	0.50	0.54	0.51	0.51	0.18	0.02
18	0.54	0.86	0.79	0.94	1.00	0.21	0.00
19	0.15	0.35	0.35	0.36	0.35	0.33	0.12
20	0.22	1.16	1.03	1.07	1.17	0.10	0.00
21	0.20	0.19	0.17	0.19	0.17	0.18	0.12
22	0.29	0.24	0.28	0.23	0.27	0.17	0.04
23	0.10	0.10	0.10	0.07	0.03	0.01	0.00
24	0.42	0.42	0.39	0.41	0.38	0.28	0.05

Note. TMMS = Trait Meta-Mood Scale–24.

Discussion and Conclusion

The main goal of this article was to obtain new validity evidence for the TMMS-24 in a community sample of Spanish adolescents as part of the growing cross-cultural analyses of EI measures. The three-dimensional structure proposed in the original instrument (Salovey et al., 1995), and in the Spanish version used here (Fernández-Berrocal et al., 2004), was confirmed. The three-factor structure of the TMMS-24 was also confirmed in the full sample and separately for male and female groups. These results converge with those obtained by previous researchers (Díaz-Castela et al., 2013; Extremera et al., 2007; Martín-Albo, Núñez, & León, 2010). As can be seen in Table 2, the dimensions that show the highest correlations are clarity and emotional attention. These results are in accordance with other findings to date in the Spanish population (Extremera et al., 2007; Fernández-Berrocal et al., 2006; Fernández-Berrocal et al., 2004).

Only Item 23 exhibited uniform DIF. In addition, this item had the lowest discrimination index, and factor loadings, both in the full sample and when analyzed across sex. This item had also demonstrated problems related to its factorial loading in previous research with Spanish adolescents (e.g., Díaz-Castela et al., 2013; Gorostiaga et al., 2011). As a possible explanation of this item's bias, the authors share the explanation put forward by Salguero et al. (2010) about the

possibility that the item might imply the need for recognition of the signs that accompany positive emotions, something that could be associated with EI skills other than emotional repair.

The reliability coefficients obtained here are similar to preceding articles (Díaz-Castela et al., 2013; Extremera et al., 2007; Gorostiaga et al., 2011; Salguero et al., 2010), where dimensions of emotional attention and emotional repair displayed the highest and the lowest coefficients, respectively. Using the IRT models, in general, *a*-parameters show moderate to very high values, indicating they are effective at discriminating individuals across the range of the latent trait (θ), especially in the dimension of emotional attention. Regarding *b*-parameters and the difference $b_4 - b_1$, when attempting to begin a psychological intervention to help a participant improve his or her EI, it is possible to plan two approaches. On one hand, if one wants to achieve significant changes for the person, it will be necessary to intervene in those aspects where the b_4–b_1 difference is greater, in this case, in the emotional repair dimension, especially in Items 21 to 24. On the other hand, the intervention will be more successful when it is carried out in those dimensions where the difference is smaller. This is because the change is easier and so, it is possible to achieve small changes that may motivate the participant to continue with the intervention. In this case, the intervention should initially focus on aspects related to emotional attention; afterward, it would be necessary to work on emotional clarity; and, finally, on the items related to emotional repair. It must be remembered that the parameter values cannot be compared between scales, but the difference $b_4 - b_1$ can be compared. So the scale in which these differences are the smallest will be the most appropriate when it comes to implementing any intervention.

With respect to the IFs of the three dimensions of the TMMS-24, the current findings suggest the most accurate measurement of EI occurs around the mean score, and the least accurate for the higher levels of EI. Thus, the TMMS-24 shows adequate reliability when assessing persons with low and medium EI scores, but this decreases when assessing participants with very high scores in EI.

Although they used a different instrument (Trait Emotional Intelligence Questionnaire–Short Form [TEIQue-SF]) from the one used in this research, the IF has a similar pattern to that found by Cooper and Petrides (2010), showing the lowest accuracy at very high levels of the latent trait. This indicates that the TMMS-24 evaluates practically the whole person with appropriate precision and has reduced precision when evaluating people with very high values in the measured variable, who make up less than 1% of the cases. This behavior of the TMMS-24 is expected, because the precision of the test is the result of the precision of each one of the items, and the precision of the items making up the TMMS-24, given by the IFs, is high for all levels of the measured variable and low for extremely high values.

Regarding the precision of the items (reliability) over the different trait levels, there was a tendency for the IIF values to decrease sharply for those θ values higher than two standard deviations above the mean. For values greater than θ (three standard deviations above the mean), the precision of the items is considerably reduced. Although in practical situations, the number of people who have these high values of EI is very scarce (less than 1%), this aspect must be borne in mind, and the TMMS-24 must be used prudently in such situations, given that its reliability is reduced when evaluating this type of person. These results are similar to those found by Cooper and Petrides (2010), in which they analyzed the IIF in the TEIQue-SF scale. Specifically, Items 7 and 8, 14 and 16, and 18 and 20 show the highest values on each subscale. Conversely, Items 5, 13, and, especially, 21 and 23 report the lowest information on each subscale of the TMMS-24.

In sum, new validity evidence obtained in a large community sample of adolescents support the three-dimensional structure of the TMMS-24 in the full sample and separately for male and female groups. With respect to the DIF analyses, Item 23 should be examined to determine the reason for the bias. The three scales assess with a high degree of precision in a wide range around the score means, decreasing in precision as the trait levels increase. These findings should prove useful when determining the focus of programs designed to increase levels of EI in adolescents (Dacre Pool, & Qualter, 2012). Finally, it would be desirable to use complementary measures coming from different sources of information, such as families, teachers, or other proxies.

Acknowledgment

The authors wish to sincerely thank the reviewers for their comments that have helped us to greatly improve the article.

Declaration of Conflicting Interests

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

Funding

The authors disclosed receipt of the following financial support for the research of this article: This research was funded by the Spanish Ministry of Education and Science, and the Ministry of Economy and Competitiveness (AP2010-1999 and PSI2011-28638).

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3.5. Quinto artículo

Suárez-Álvarez, J., Pedrosa, I., García-Cueto, E., y Muñiz, J. (en prensa). New validity evidence support locus of control bidimensionality. *Anales de Psicología.*

El objetivo de este artículo es presentar nuevas evidencias de validez sobre la dimensionalidad del locus de control. El locus de control es uno de los rasgos incluidos en el modelo integral del espíritu emprendedor y uno de los rasgos específicos para evaluar la personalidad emprendedora. Por lo tanto, la principal aportación de este artículo a la tesis doctoral es la comprobación de la estructura factorial que mejor representa los datos para su posterior utilización en el modelo de evaluación de la personalidad emprendedora.

Factor de Impacto JCR 2014 = 0,504 ; Q3.

Factor de Impacto 5 años = 0,634

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ISSN edición impresa: 0212-9728
ISSN edición web: 1695-2294
http://revistas.um.es/analesps/

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DATOS DEL ARTÍCULO:

Título: Nuevas evidencias de validez apoyan la bidimensionalidad del Locus de Control.

Autores: Javier Suárez-Álvarez, Ignacio Pedrosa, Eduardo García-Cueto, José Muñiz

CÓDIGO: 200781

Recibido: 20-05-2014

Asunto: ACEPTACIÓN DEL ARTÍCULO

Agustín Romero Medina
Director de **anales de psicología**
Facultad de Psicología, Universidad de Murcia
Aptdo. 4021, 30080 Murcia
Tlf.: 868 883483, Fax: 868 884115
E mail: analesps@um.es

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New validity evidence support locus of control bidimensionality

Javier Suárez-Álvarez[1], Ignacio Pedrosa[1], Eduardo García-Cueto[1] and José Muñiz[1, 2]

[1]University of Oviedo, [2]Center for Biomedical Research in the Mental Health Network (CIBERSAM), Spain

Javier Suárez-Álvarez. Departamento de Psicología. Universidad de Oviedo. Plaza Feijoo, s/n, Office 4. 33003. Oviedo (Spain). Email: suarezajavier@uniovi.es. Phone: +34985103272 ***Corresponding author.**

Ignacio Pedrosa. Departamento de Psicología. Universidad de Oviedo. Plaza Feijoo, s/n, Office 4. 33003. Oviedo (Spain). Email: pedrosaignacio@uniovi.es. Phone: +34985103272

Eduardo García-Cueto. Departamento de Psicología. Universidad de Oviedo. Plaza Feijoo, s/n. 33003, Oviedo (Spain). Email: cueto@uniovi.es. Phone: +34985104162

José Muñiz. Departamento de Psicología. Universidad de Oviedo. Plaza Feijoo, s/n. 33003, Oviedo (Spain). Email: jmuniz@uniovi.es. Phone: +34985103272

Acknowledgements

This research was funded by the Spanish Ministry of Education and Science and the FPI and FPU programs of the Ministry of Economy and Competitiveness. References: PSI2011-28638, BES2012-053488, *IB-05-02, and AP2010-1999.*

Esta investigación fue financiada por el Ministerio de Economía y Competitividad y el Ministerio Educación y Ciencia del Gobierno de España. Referencias: *PSI2011-28638,* BES2012-053488, *IB-05-02, and AP2010-1999.*

Resumen

El estudio del locus de control (LOC) presenta una larga tradición en Psicología, y se han diseñado distintos instrumentos para su medición. Sin embargo, la dimensionalidad del constructo no está clara y sigue siendo motivo de controversia en la actualidad. El objetivo del presente trabajo es presentar nuevas evidencias de validez sobre la dimensionalidad del LOC. Para ello se ha desarrollado un nuevo instrumento de medida compuesto por 23 ítems. Se utilizó una muestra de 697 participantes de los cuales el 57.5% fueron mujeres (*M*=22.43; *DT*= 9.19). Los resultados apoyan la bidimensionalidad del LOC: interno y externo. El coeficiente de fiabilidad de cada subescala fue de .87 para LOC interno y .85 para LOC externo. Por otra parte, ambas subescalas han mostrado adecuadas evidencias de validez en función de las relaciones con la autoeficacia, motivación de logro y optimismo (r_{xy}> .21). Se encontraron diferencias estadísticamente significativas en función del sexo (p < .05), los hombres puntuaron más alto en LOC externo y las mujeres en LOC interno. Las evidencias de validez aquí presentadas apoyan una estructura de dos dimensiones para el constructo LOC. El instrumento desarrollado ha mostrado adecuadas propiedades psicométricas en términos de validez y fiabilidad.

Palabras clave: Locus de control interno; locus de control externo; dimensionalidad; validez.

Abstract

Locus of control (LOC) has a long tradition in Psychology, and various instruments have been designed for its measurement. However, the dimensionality of the construct is unclear, and still gives rise to considerable controversy. The aim of the present work is to present new evidence of validity in relation to the dimensionality of LOC. To this end, we developed a new measurement instrument with 23 items. The sample was made up of 697 Spanish participants, of whom 57.5% were women (*M*=22.43; *SD*= 9.19). The results support the bi-dimensionality of LOC: internal (α=.87) and external (α=.85). Furthermore, both subscales have shown adequate validity evidence in relation to self-efficacy, achievement motivation and optimism (r_{xy}> .21). Statistically significant differences were found by sex (p < .05): men scored higher in external LOC and women in internal LOC. The validity evidence supports a two-dimensional structure for the LOC, and the measurement instrument developed showed adequate psychometric properties.

Keywords: Internal locus of control; external locus of control; dimensionality; validity.

People who score high on internal locus of control tend to attribute responsibility for their actions to themselves, whilst those scoring high on external locus of control attribute their successes and failures to external factors, such as luck or coincidence (Rotter, 1966; Weiner, 1979). The influence of the locus of control (LOC) construct in Psychology has been notable, and correlations have been found with other psychological variables – for example high scores on external LOC are associated with symptoms of depression and anxiety (Cheng, Cheung, Chio & Chan, 2012), while high scores on internal LOC are positively related to achievement motivation (Suárez-Álvarez, Campillo-Álvarez, Fonseca-Pedrero, García-Cueto & Muñiz, 2013), self-efficacy (Severino, Aiello, Cascio, Ficarra & Messina, 2011) and optimism (Urbig & Monsen, 2012).

The evaluation of the LOC construct has given rise to a range of measurement instruments, from Rotter's (1966) seminal internalism-externalism scale to the present day (Cheng et al., 2012). Notable in this regard are the *Adult Nowicki-Strickland Internal-External Control Scale* (Nowicki & Duke, 1983), the *Internal Control Scale* (Duttweiler, 1984), the *Internality, Powerful Others and Chance Scale* (Levenson, 1981), and the *Spheres of Control Scale* (Paulhus & Van Selst, 1990). However, and despite the abundance of research on LOC, no consensus has been reached in the scientific literature with regard to its dimensionality (Ferrando, Demestre, Anguiano-Carrasco & Chico, 2011; Kormanik & Rocco, 2009). Initially, LOC was measured by means of an internalism-externalism scale, that is, as a single, continuous dimension with two opposing poles (Rotter, 1966). This one-dimensional structure was confirmed in later studies, such as those of Nowicki and Duke (1983), or Duttweiler (1984), and is still widely used today (Beretvas, Suizzo, Durham & Yarnell, 2008; Ferrando et al., 2011). However, Levenson (1974) proposed a multidimensional measure made up of

internal LOC, external LOC and a chance factor. Based on this line of work, some of the most widely used scales have been generated, including the *Internality, Powerful Others and Chance Scale* (Levenson, 1981), the *Spheres of Control Scale* (Paulhus & Van Selst, 1990) and the *Belief in Luck and Luckiness Scale* (Thompson & Prendergast, 2013). In sum, there is no unanimous agreement on the dimensionality of LOC, neither does there seem to be any agreement about its equivalence in different cultures (Bonetti et al., 2001; Malcarne, Fernández, & Flores, 2005; Smith, Trompenaars, & Dugan, 1995). The results are highly inconsistent and it is not clear whether these discrepancies in the results are due to measurement problems or to cultural variations in the structure of LOC (Cheng et al., 2012; Rossier, Dahourou, & McCrae, 2005).

In recent decades, multidimensional measurement has predominated in specific contexts (Lefcourt, 1991; Zimmermann, Rossier, Stadelhofen, & Gaillard, 2005). Thus, for example, the model proposed by Levenson (1974) has been confirmed in the clinical field (Stevens, Hamilton & Wallston, 2011); in the educational context, with samples of adults with and without children (Furnham, 2010); and in the prison context with samples of offenders (Huntley, Palmer & Wakeling, 2012).

Despite the abundance of studies to date, some basic issues remain unresolved, and in particular the dimensionality of the construct itself (Beretvas et al., 2008). The main reason for the discrepancies is the lack of comparability between the different measurement instruments employed, in relation to both the format and the social, academic or work contexts addressed by the scales. Thus, for example, whilst some scales use pairs of forced-choice items (e.g. *I-E Rotter Scale;* Rotter, 1966), others, like the *Nowicki-Strickland Locus of Control Scale* (Nowicki & Duke, 1983), use dichotomous items, even though the majority use Likert-type items, which hinders their strict psychometric comparability (Muñiz, García-Cueto & Lozano, 2005). Furthermore,

most of the scales are designed to assess locus of control in a specific domain, be it academic, social, political, cultural, work-related, or other, which means they are context-dependent, and this makes proper generalization of the results quite difficult (Marsh & Richards, 1987). Scales focusing on particular contexts do not permit general studies that go beyond that context, and this gives rise to methodological problems, such as increased measurement error (Lefcourt, 1991) and difficulties for interpreting the dimensionality of the instrument when confirmatory analysis and structural equation modelling are used (Little, Cunningham & Shahar, 2002). In sum, the interpretation of the results can vary if a context-specific scale is used instead of general scale (Wang, Bowling & Eschleman, 2010).

Within this research framework, the core objective of the present work was to add new validity evidence in relation to the dimensionality of LOC. To this end we designed a new measurement instrument. There are several reasons that justify the development of a new measurement instrument, among them: a) that was not context-dependent, thus permitting greater generalization of the results beyond a particular domain, be it academic, clinical, work-related, or other (Lefcourt, 1991; Little et al., 2002; Wang et al., 2010), b) the Likert-type format was chosen with the aim of overcoming the limitations of forced-choice questionnaires (Ferrando et al., 2011) and dichotomous scales (Watters, Thomas & Streiner, 1990), y c) it proposed a bifactorial structure in order to reflect parsimoniously the construct measured. As a second goal we analyzed differences in LOC according to sex and age. From a methodological point of view, an important contribution of the present research is the use of Item Response Theory models (IRT), which allows a more precise analysis of the psychometric characteristics of the measurement instruments (De Ayala, 2009; Wilson, 2005).

Method

Participants

A sample of 697 participants from Spain was used, obtained by means of convenience sampling. Age ranged from 13 to 63 years, with a mean of 22.43 and standard deviation of 9.19. Males accounted for 42.5% of the sample and females for 57.5%. As far as educational level is concerned, 15.2% had basic secondary-school education, 37.1% had completed high school, 14.7% had vocational training of some kind, and 33% were graduates.

Instruments

Locus of Control Scale

With the aim of assessing LOC, we drew up 25 Likert-type items using 5-point scales, where *1* indicated "*totally disagree*" and *5* "*totally agree*". We used a 5-point scale, since the best estimations of psychological parameters are obtained with between 4 and 6 response categories (Lozano, García-Cueto & Muñiz, 2008). The Likert-type format was chosen with the aim of overcoming the limitations of forced-choice questionnaires (Ferrando et al., 2011) and dichotomous scales (Watters, et al., 1990). In constructing the instrument we followed the international recommendations that can be found in the psychometric literature (AERA, APA, NCME, 1999; Downing, 2006). Although previous research was used to ensure the content validity of the new scale, the items were developed from scratch in Spanish with the aim of overcoming the limitations of existing instruments. The items include the essential features of the scales already in existence (Duttweiler, 1984; Levenson, 1981; Nowicki & Duke, 1983; Paulhus & Van Selst, 1990; Rotter, 1966), but the content is designed to represent a general domain, avoiding the contextual specificity that can hinder the comparison of

results (Lefcourt, 1991; Little et al., 2002; Wang, et al., 2010). The items were developed with the aim of appropriately representing the domain of the content. A review of the specialized literature established that the content of the items should be representative of both internal and external causal attributions. A group of experts was then used to evaluate the validity of the content of the items.The psychometric properties of the scale are shown in the results section.

Self-efficacy scale

The present work forms part of a much broader project that assessed other variables related to locus of control, such as self-efficacy (Suárez-Álvarez, Pedrosa, García-Cueto & Muñiz, 2014). The self-efficacy scale employed is made up of 20 items with a 5-point Likert-type response format, and showed high internal consistency (α coefficient =.98); the factor structure was essentially one-dimensional (the first factor explained 30% of the total variance; Goodness of Fit Index (GFI) =.98; the Standardized Root Mean Square Residual (RMSR) =.045; Standard Error (SE) =.054).

Achievement motivation scale

Achievement motivation is another variable clearly related to LOC (Suárez-Álvarez et al., 2013). It was assessed by means of a 15-item scale with a 5-point Likert-type response format, with high internal consistency (α coefficient =.88); the factor structure was essentially one-dimensional (the first factor explained 36% of the total variance; GFI=.99; RMSR=.04; SE=.054). Further information can be found in Suárez-Álvarez et al. (2014).

Optimism scale

Optimism also maintains a close relation with LOC (Urbig & Monsen, 2012). It was assessed using an 11-item scale with a 5-point Likert-type response format showing

good internal consistency (α coefficient =.85); the factor structure was essentially one-dimensional (the first factor explained 38% of the total variance; GFI=.99; RMSR=.046; SE=.054). Further information can be found in Suárez-Álvarez, et al. (2014).

Apart from the theoretical reasons which influenced the choice of external validation variables, considerations when it came to choosing the specific instruments for evaluation included having appropriate psychometric properties in the Spanish population and having small numbers of items. Likert type were favored over dichotomous items (Lozano et al., 2008; Muñiz et al., 2005).

Procedure

The questionnaire was applied using paper-and-pencil (n=357) and computerized versions (n=340). Participants were informed that their responses were confidential and anonymous, and participation was totally voluntary. The application instructions were the same in all cases and sample collection was carried out during 2012/2013. The participants did not receive any type of compensation for their participation. The Ethics Committee of the Faculty of Psychology in the University of Oviedo gave their approval for this research to be carried out

Data Analyses

First of all, measurement invariance between administration groups (i.e. paper and pencil, and computerized) was analyzed using structural equation modeling (SEM) within the framework of a confirmatory factor analysis (CFA) model (Byrne, 2008; Dimitrov, 2010). Then, we carried out an analysis of the LOC scale items by subscale using the total sample (N=697). To this end, we calculated the discrimination index of the items and made a study of the Differential Item Functioning (DIF) of each subtest

using the logistic regression method (French, Hand, Therrien, Valdivia Vazquez, 2012). In order to reduce the false positive rates, an effect size decision rule (R^2>.035) is used in combination with a statistical test (Gómez-Benito, Hidalgo, & Zumbo, 2013). Next, the total sample was divided randomly into two subsamples (N_1=333; N_2=344) in order to perform a Confirmatory Factor Analysis (CFA) with cross-validation. The estimation method used is that of robust maximum likelihood, which shows the best fit of the model to the data. A CFA was carried out with the first subsample. At this step, the measurement errors were correlated with the aim of reflecting realistically the constructs being measured (Byrne, 2001). We next applied another CFA in the second subsample without modifying the model proposed in the first subsample (Morales-Vives, Camps, & Lorenzo-Seva, 2013). Evaluation of goodness-of-fit to the sample data was determined on the basis of multiple criteria: the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR). Indices of fit were calculated for both the one-dimensional model and the two-dimensional model. However, given that fit indices such as CFI and SRMR tend to reject one-dimensional models (Kóbor, Takács, & Urbán, 2013; Reise, Scheines, Widaman, & Haviland, 2013), we used the Akaike Information Criteria (AIC) and the Bayesian Information Criteria (BIC) for comparing the two models (Burnham & Anderson, 2004; Kline, 2005).

Next, internal consistency of the subscales was calculated by means of Ordinal Cronbach's coefficient (Elosua, & Zumbo, 2008). We also obtained the information functions of the two subscales as a complementary measure of reliability (Cheng, Yuan, & Liu, 2012). For their calculation we used Samejima's graded response model (1969). The Kolmogorov-Smirnov test was used for the study of normality. Furthermore, we examined the Spearman correlations between the subscales of the LOC test and the self-

efficacy, achievement motivation and optimism scales. The Mann-Whitney U and Kruskal-Wallis tests were carried out to study differences as a function of sex, age and completed studies. The estimation of effect size for non-parametric tests was done using *Probability of Superiority* (*PS*; Grissom & Kim, 2011). The sample was divided between two balanced groups by age: under 18s and over 18s. The Listwise deletion method was used for the treatment of the missing values (Cuesta, Fonseca-Pedrero, Vallejo, & Muñiz, 2013; Fernández-Alonso, Suárez-Álvarez, & Muñiz, 2012). Data were analyzed with SPSS 19.0, Mplus 6 and MULTILOG 7.

Results

Measurement Invariance across administration groups

Several nested models of Multiple Group Confirmatory Factor Analysis (MG-CFA) were performed to study the factor loadings invariance (i.e. Model 1), intercepts invariance (i.e. Model 2), and error variances and factor variances are equal across groups (i.e. Model 3), according to the models proposed by Muthén & Muthén (2010). The CFI difference between baseline model and model 1 was .005; the CFI difference between model 1 and model 2 (partial scalar invariance) was .006; and the CFI difference between model 2 and model 3 (partial residual invariance) was .006. The confidence intervals of the RMSEA index were overlapped in all cases.

Item Analysis

A group of external judges, comprising ten professors who were experts in clinical evaluation in different Spanish universities, evaluated the content of the items. The experts had to identify the dimension that they thought each one of the items should belong to from a group of dimensions that served as distractors (self-efficacy, optimism,

motivation for success, autonomy, innovation, risk taking and stress tolerance). In 84% of cases the items were correctly classified and in all cases there was consensus from at least a third of the experts.

We removed the items of each dimension with discrimination indices below .25 (Muñiz, Fidalgo, García-Cueto, Martínez & Moreno, 2005). In accordance with this criterion we eliminated item "*Parents determine the future of their children"* and item "*I can avoid most of negative events in my life"*. In line with Gómez-Benito et al. (2013), no item presented DIF, since the items that were statistically significant in the logistic regression (items 1 and 9 in external locus of control and items 6 and 8 in internal locus of control) had very low effect size (R^2<.035).

Assessment of dimensionality

Table 1 shows the results of the confirmatory models tried for the study of dimensionality. The unidimensional model assumes that all of the items are made up of, and have significant weight in, one factor. The bidimensional model assumes that the items make up two factors and each one of the items only has significant weight in one of them (see table 2 for which items are which). The measurement errors were correlated of those items whose residual covariances suggested a substantial improvement of fit if the parameter in question is freely estimated (i.e. modification indices above 10). Table 1 shows the goodness-of-fit indices for the data to the two-dimensional model in the two subsamples. The χ^2 divided by the degrees of freedom is above 2 (Byrne, 2001), the CFI index is around .90, and the RMSEA and the SRMR is below .08 in both subsamples (Kline, 2005). Nevertheless, when the structure is one-dimensional, the χ^2/df, RMSEA, SRMR, AIC and BIC indices increase and the CFI index decreases. In any case, for comparing models, the indices that emerge as appropriate would be the AIC and the BIC (Kline, 2005). Moreover, they are especially

interesting in this case, as they tend to benefit the most parsimonious model (Kline, 2005), though at the same time they involved a greater loss of information for the one-dimensional model. The correlation between both factors was -.51 ($p < .001$). Despite the fact that the data support the two-dimensional structure, it should be borne in mind that the two factors are highly correlated ($r = -.51$).

Table 1
Confirmatory Factor Analysis of the test with cross-validation of the items

Model	χ^2/df		*CFI*		*RMSEA*		*SRMR*		*AIC*		*BIC*	
	N1	N2	N1	N2	N1	N2	N1	N2	N1	N2	N1	N2
Two-dimensional	1.58	1.79	.90	.88	.04	.05	.06	.06	19220	20178	19506	20466
One-dimensional	2.29	2.70	.77	.75	.06	.07	.07	.08	19408	20433	19690	20717

Note: N1=333; N2=344.

In sum, the first factor, external LOC, is made up of 13 items, where a high score indicates an external attributional style. The second factor, internal LOC, is made up of 10 items, where a high score indicated an internal attributional style. The factor loadings of the items ranged from .28 to .76. The variance explained by the first factor in the case of Internal LOC is 40.15% while for External LOC it is 35.06%

Internal consistency of the subscales

The ordinal alpha's coefficient for the external LOC subscale was .85, and for the internal LOC subscale, .87. The discrimination indices of the items from Classical Test Theory ranged from .26 to .62.

IRT analysis

Table 2 shows the parameters of discrimination (a) and difficulty (b_1-b_4) for the 23 items of the LOC subscales. In general, the items showed moderate levels of discrimination (Baker, 2001). Regarding the b parameters, it should be noted that when

Samejima's Graded Response Model is used the number of b parameters is equal to the number of alternatives minus 1, resulting in a total of four parameters in this case. The reason is because the probability of selecting the first category or a superior one would always be 1 and therefore it is not included in the results. The difficulty parameters presented in Table 2 indicate that the items are measuring appropriately for low and medium ability levels of internal LOC and for medium and high ability levels of external LOC.

Table 2

Item Response Theory parameter estimates for the Locus of Control subescales

Items	a	b_1	b_2	b_3	b_4
External Locus of Control					
1.When I fail I think it is because someone is against me **Cuando fracaso pienso que es porque hay gente que está en mi contra*	1.22	-0.08	1.51	3.00	4.61
2.When I have troubles I hope the problem solves itself **Cuando tengo un problema espero que se solucione solo*	1.27	-0.38	1.15	2.32	3.59
3.Victory only depends on luck **El triunfo sólo depende de la suerte*	1.14	-0.71	1.11	2.74	4.15
4.Chance plays a basic role in my life **En mi vida el azar juega un papel fundamental*	1.62	-0.72	0.66	1.77	2.85
5.It is impossible to change my future **Es imposible cambiar mi futuro*	0.85	0.57	1.96	2.90	3.78
6.To be success it is necessary to have good contacts **Es necesario un "enchufe" para tener éxito*	0.60	-2.07	0.08	2.90	6.11
7.The future is predetermined **Estamos predestinados*	1.11	-0.20	0.99	2.49	3.70
8.I like to trust in luck **Me gusta confiar en la suerte*	1.66	-0.85	0.46	1.43	2.36
9.My failures are due to the people surrounding me **Mis fracasos se deben a la gente que me rodea*	1.25	-0.02	2.04	3.41	4.53
10.I can´t avoid hurting people that I love **No puedo evitar hacer daño a la gente que quiero*	0.80	0.16	1.70	2.70	4.29
11.If something is going to go wrong, it will do no matter what I do **Si algo va a salir mal da igual lo que haga*	0.95	-1.02	0.80	2.53	3.49
12.If I have to make a decision, I let other people do it for me **Si tengo que tomar una decisión dejo que otras personas lo hagan por mí*	0.92	-0.37	1.67	3.01	4.18
13.I trust in luck to have success in my life **Confío en la suerte para tener éxito en mi vida*	1.68	-0.88	0.29	1.32	2.31

Internal Locus of Control					
1.Success depends on my effort **El éxito depende de mi esfuerzo*	2.05	-3.12	-2.69	-1.60	0.14
2.What I have, depends on the effort that I make to get it **Lo que tengo depende del esfuerzo que hago para conseguirlo*	1.57	-3.80	-2.67	-1.32	0.73
3.My future depends on what I do **Mi futuro depende de lo que yo haga*	1.84	-3.77	-2.93	-1.69	0.27
4.My life depends on myself **Mi vida depende de mí mismo*	1.10	-4.47	-2.84	-1.22	0.81
5.My success is the consequence of my effort **Mis éxitos son consecuencia de mi esfuerzo*	2.82	-3.10	-2.37	-1.29	0.36
6.Effort is necessary to reach a goal **Para alcanzar una meta es necesario esforzarse*	1.54	-4.18	-3.61	-2.57	-0.47
7.I can solve problems if I try hard enough **Puedo resolver los problemas si me esfuerzo lo suficiente*	1.32	-4.62	-3.30	-1.70	0.63
8.When I fail, I assume that the mistake could be mine **Cuando fracaso asumo que el error ha podido ser mío*	0.66	-7.23	-4.46	-2.30	1.08
9.My mistakes are my fault **Mis errores son culpa mía*	0.66	-6.93	-4.76	-1.86	1.15
10,Exam marks depend on what you have studied **La nota en un examen depende de lo que hayas estudiado*	0.63	-5.60	-3.24	-1.38	1.64

Note. *a*=discrimination parameter; b_1, b_2, b_3, b_4 =difficulty parameters ** Original items applied*

The information function of the external LOC subscale (*Figure 1*) gives rise to less measurement error for trait values of -1 to +2, whilst the internal LOC subscale (*Figure 2*) gives rise to values of -3 to +1. The height of the curves indicates that the quantity of information is high for medium levels of LOC. Specifically, the information provided for this level is approximately 6 for external LOC and 7 for internal LOC. The corresponding standard errors values are approximately .18 and .17. That is, for an individual whose level is estimated to be 0, the confidence interval at 95% would be ±.35 (1.96*.18) for external locus, and ±.33 (1.96*.17) for internal locus. These data obtained using the IRT models converge with those calculated under the classical test theory approach.

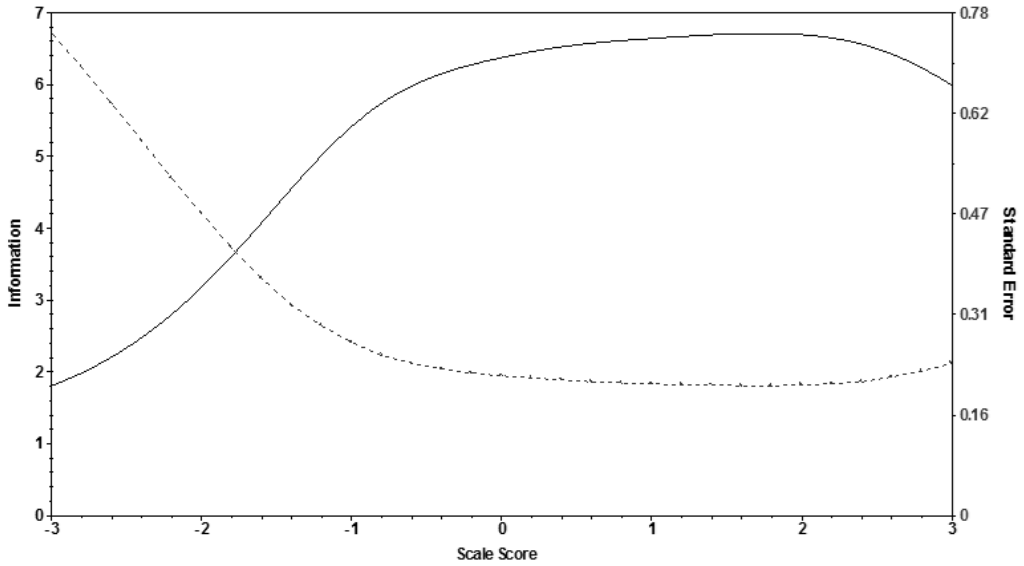

Figure 1. Information function of external LOC subscale

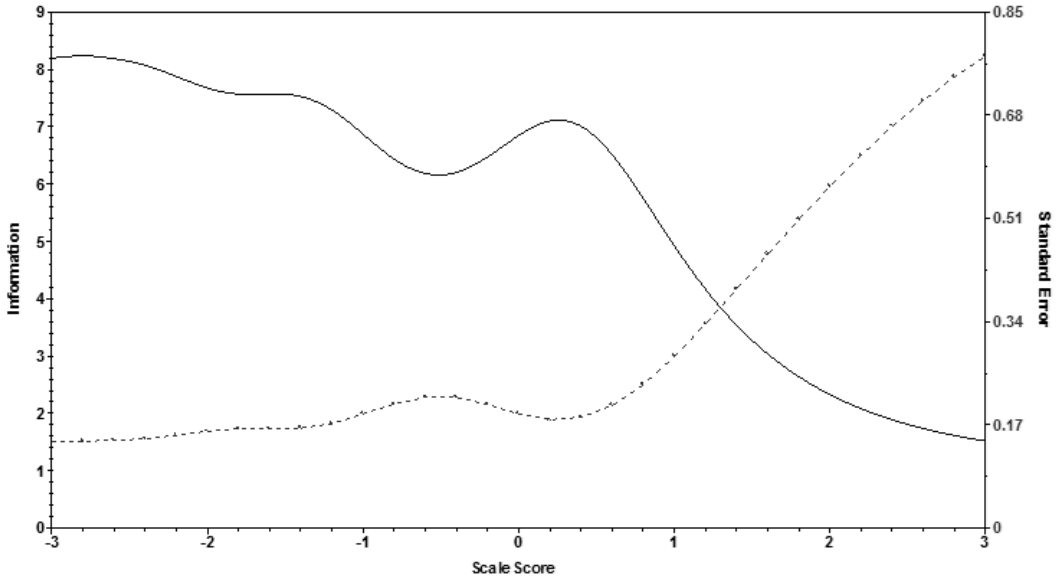

Figure 2. Information function of internal LOC subscale

Validity evidence based on the relationship with other variables

Table 3 shows the Spearman correlations between the subscales of LOC and self-efficacy, achievement motivation and optimism. As it can be seen, all of them were statistically significant (p<.001) and higher than .20, highlighting the relation between internal LOC and Achievement motivation (r_{xy}= .45). The internal LOC subscale was

positively correlated with the other variables; in contrast, and as expected, the external LOC subscale was negatively correlated with all of them.

Table 3
Spearman correlations between the subscales of LOC and self-efficacy, achievement motivation and optimism

	External LOC	Internal LOC
Self-efficacy	-.30	.41
Achievement motivation	-.35	.45
Optimism	-.21	.29

Study of the differences as a function of sex, age, and studies completed

The total scores in the subscales were calculated by summing the scores in the items. Therefore, the scores in the Internal LOC subscale were between 10 and 50 points (10 items with 5 answer categories), and in the External LOC subscale the scores were between 13 and 65 points (13 items with 5 answer categories). The Kolmogorov-Smirnov test for the study of normality was statistically significant (p<.001) for both subscales, so that the Mann-Whitney U test was used for the study of the differences. As can be seen in Table 4, there are statistically significant differences (p<.05) in both subscales by sex. Women score higher on internal LOC and men on external LOC. The effect sizes show that the differences were relatively large; the Probability of Superiority is close to .50. As regards participants' age, there are only statistically significant differences (p<.05) in external LOC, with under-18s scoring highest. Furthermore, the effect size shows a small differences for external LOC (*PS* =.37) and a relatively large difference for internal LOC between both groups (*PS* =.50).

Table 4
Comparison of means with Mann-Whitney U Test and effect size of each subscale

	Sex					Age				
Subscales	Male	Female	Z	*p*	*PS*	Under 18	Over 18	Z	*p*	*PS*
	MR	MR				MR	MR			
Internal	326.07	361.41	-2.30	.021	.45	340.20	338.88	-0.09	.930	.50
External	364.90	322.57	-2.78	.005	.44	378.26	293.81	-5.66	<.001	.37

Note: MR=Mean Rank; PS= Probability of Superiority

Table 5 presents the result of the study of differences in LOC as a function of level of education. It can be seen that there are only statistically significant differences in External LOC (p< .001). Pairwise comparison shows that participants who completed their secondary education scored significantly higher than those who completed their further education (p < .001; PS =.33) who in turn scored higher than university students (p < .001; PS =.37). Nevertheless, it must be borne in mind that the effect size is small (PS < .50) so the differences may not be considered large.

Table 5
Comparison of rank means with Kruskal-Wallis Test of each subscale as a function of studies completed

Subscales	Secondary (1)	High School (2)	Prof. Training (3)	University (4)	χ^2 (df)	*p*
	MR	MR	MR	MR		
Internal	328.40	355.69	360.12	338.44	2.25(3)	.522
External	451.64	345.33	396.03	262.23	76.76(3)	<.001

Note. MR=Mean Rank; χ^2*= chi-square test; df= degrees of freedom*

Discussion and conclusions

The core objective of the present work was to contribute new evidence of validity in relation to the dimensionality of the locus of control construct. To this end we designed a new measurement instrument that was not context-dependent, thus facilitating greater generalization of the results beyond a specific domain. Locus of control has a long tradition in psychological research, having been associated with depression and anxiety symptoms (Cheng et al., 2012), achievement motivation (Suárez-Álvarez et al., 2013), self-efficacy (Severino et al., 2011) and optimism (Urbig & Monsen, 2012). However, there does not appear to be a consensus in the scientific literature as regards its dimensionality (Ferrando et al., 2011; Kormanik & Rocco, 2009).

The progressive evaluation of factorial invariance allows us to confirm a strict measurement invariance assumption across administration groups (i.e. paper and pencil, and computerized). This provides evidence that the items were measured with the same precision in each group (Dimitrov, 2010).The instrument developed for the assessment of LOC did not present DIF for men and women in any item. However, two items were removed for their low discriminative power. All the items presented discrimination indices and factor loadings over .25. The results of the CFA permitted confirmation of the two-dimensional structure (internal LOC and external LOC). The first of these dimensions is made up of 10 items with a reliability coefficient of .87, and the second of 13 items with a reliability coefficient of .85. According to the Akaike Information Criteria and the Bayesian Information Criteria (Burnham & Anderson, 2004; Kline, 2005), it can be concluded that the two-dimensional model contributes better information than the one-dimensional model, which implies that we can discard the one-dimensionality of the construct. Nevertheless, these results should be interpreted taking into account the high correlation between the factors (r = -.51). In summary, given the high correlation between the scores in both subscales the possibility of producing a global Locus of Control score might be considered. Nonetheless, from an applied point of view it seems more appropriate to evaluate the locus of control from one score for internal, and another for external LOC. The results seem to suggest that a person may make internal attributions of their behavior at the same time as accepting the influence of chance in their life.

As indicated by the Information Functions of the two LOC scales (internal and external), both permit the accurate measurement in a wide range of mean levels of the assessed trait. These results coincide with those obtained within the Classical Test Theory framework, but they provide additional information in showing that the

accuracy of the instrument is reduced when evaluating very low levels of External LOC and very high levels of Internal LOC. Taking into account that most of tests to date were developed from a CTT approach, it is interesting compare both approaches. It is important to emphasize that the use of IRT models to estimate the psychometric properties of the tests has many advantages, both at the theoretical and applied level. Of these advantages, a notable one is that not only are the parameter estimates more accurate but they are also made based on the level of ability that the person has in the evaluated construct (De Ayala, 2009; Van der Linden, & Hambleton, 1997; Wilson, 2005). If the intention is to evaluate people with both high and very low levels on this Locus of Control test, the scores should be interpreted with particular care because the error that occurs in such cases would be higher than in cases where the scores are in the medium levels. Secondly, the metric invariance that the IRT models are based on would enable the generalizing of the properties of the measuring instrument to any sample of subjects from the same population. That is, the accuracy of the instrument would be the same if any other sample of adolescents were randomly selected, which does not happen for example with the Cronbach's alpha coefficient (Hambleton, Swaminathan, & Rogers, 1991; Muñiz, 1997). These kinds of results can provide new sources of reliability that are complementary to the classical internal consistency, an issue that is considered vital today for the appropriate development of a rigorous psychological assessment (McCrae, 2013).

The Spearman correlations between the subscales of LOC and self-efficacy, achievement motivation and optimism were statistically significant (p<.001). The values ranged from .21 to .45 and the highest correlation reached was between Achievement motivation and internal locus of control. Moreover, a positive relation was observed between these variables and internal locus of control and a negative relation

with external locus of control. Thus, it can be concluded that the evidence of validity found, as regards the relation between the test and other variables, is adequate, and in line with that found in other research (Severino et al., 2011; Suárez-Álvarez et al., 2013; Thompson & Predergast, 2013; Urbig & Monsen, 2012). Furthermore, the measurement of these variables has practical implications in different contexts, such as psychological disorders (Cheng et al., 2012) or work settings (Suárez-Álvarez et al., 2013).

The study of the differences by age shows that those aged 18 or under score significantly higher than those aged over 18 in external LOC; however, there are no statistically significant differences in internal LOC according to age ($p > .05$). These results differ to some extent from what was expected, since the general tendency in studies with adult populations is to find a negative relation between age and perception of control (Cheng et al., 2012). As regards differences according to sex, men scored significantly higher in external locus of control, and women in internal locus of control ($p > .05$). These results confirm the findings of Manager and Eikeland (2000). The results related to the difference in terms of completed studies show that the scores in external LOC are higher for the lowest educational levels. These results accord with those found in terms of age although it must be remembered that under eighteens are part of the group who, at most, may have completed secondary education. In any case, the differences must be interpreted with caution as the size of the effect is small.

In conclusion, the validity evidences presented here support a structure of two correlated dimensions for evaluating the locus of control construct. For its part, the instrument designed for assessing these dimensions presents adequate psychometric properties as regards reliability and validity. The results presented here have practical implications on two levels. In the first place, the scale that was developed gives researchers and professionals a tool which evaluates LOC quickly and precisely.

Furthermore the content of the items allows them to be used in various contexts such as clinical, academic or the workplace. Secondly, it is to be hoped that a specific intervention in LOC would affect related variables that are important nowadays, such as achievement motivation (Suárez-Álvarez et al., 2013), entrepreneurial spirit (Muñiz, Suárez-Álvarez, Pedrosa, Fonseca-Pedrero, & García-Cueto, 2014), or some psychological disorders such as depression and anxiety (Cheng et al., 2012).

The results reported here should be interpreted taking into account the following limitations. First of all, it would be advantageous to increase the representativeness of the sample, with a view to achieving better generalization of the results. All the data employed come from self-reports, and in future research it would be useful to administer other types of measurement instrument for the assessment of locus of control, such as interviews or situational tests. It would also be interesting to work with different cultures, in an effort to explore the invariance of the LOC construct in relation to cultural variations. From a psychometric point of view, the next step would involve developing a Computerized Adaptive version of the scales, which would permit researchers and practitioners a more precise assessment of the construct (Barrada, 2012; Van der Linden, & Glas, 2010).

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4. Discusión

La figura del emprendedor es fundamental para la economía de cualquier país, ya que constituye una importante fuente de innovación, empleo, productividad y crecimiento. El interés por esta figura ha ido evolucionando a lo largo de las últimas décadas manteniendo, como denominador común, a la persona como aspecto central del proceso emprendedor (Rauch y Frese, 2007a). Las perspectivas económicas y sociológicas han contribuido sustancialmente al desarrollo teórico del proceso emprendedor, mientras que la Psicología es quien ha tomado las riendas en los últimos años destacando por su aportación en la evaluación de la personalidad emprendedora.

La personalidad emprendedora, como la mayoría de las actividades que llevan a cabo las personas, tiene un carácter multidimensional, y depende tanto de aspectos contextuales (sociedad, cultura, situación económica, etc.), como de las características personales (aptitudinales y de personalidad), así como de la interacción de ambos aspectos. Por tanto, comprender de forma rigurosa lo que lleva a una persona a ser un emprendedor de éxito exige conocer a fondo todas las dimensiones citadas. La presente tesis doctoral se centra fundamentalmente en los aspectos psicológicos de las personas emprendedoras y dentro de estos en las características de personalidad. El principal objetivo de este trabajo es la identificación de los rasgos de personalidad más característicos de las personas emprendedoras así como desarrollar una batería de pruebas para evaluarlos de forma objetiva. Este enfoque centrado en el análisis de los rasgos de personalidad de las personas emprendedoras se ha ido consolidando en los últimos años como una de las principales aproximaciones psicológicas al estudio del

espíritu emprendedor (Chell, 2008; Hisrich et al., 2007; Rauch y Frese, 2007a, 2007b). Revisiones recientes del área (Brandstätter, 2011; Rauch y Frese, 2007a; Zhao et al., 2010) identifican dos líneas de investigación complementarias, por un lado están quienes se inclinan por trabajar con los rasgos generales clásicos de personalidad, tipo Big Five, y por otro quienes prefieren utilizar rasgos más específicos y cercanos a la conducta emprendedora. Ambos enfoques son necesariamente complementarios, se trata de establecer con precisión la capacidad de predicción de ambas perspectivas, y analizar el grado de convergencia entre ellas. De hecho, en la actualidad existen resultados que sugieren que los rasgos más específicos de la personalidad emprendedora añaden validez predictiva del éxito empresarial con respecto a los Big Five de la personalidad (Leutner, Ahmetoglu, Akhtar y Chamorro-Premuzic, 2014). En otras palabras, la inclusión de ambas medidas a lo largo del proceso de evaluación mejoraría la toma de decisiones y el poder predictivo. Por esta razón, el modelo presentado en la Figura 3 contempla de forma interactiva ambos modelos de la personalidad emprendedora. La presente Tesis Doctoral se centra precisamente en el cruce entre ambos modelos, por un lado se ha desarrollado una nueva batería para evaluar los rasgos específicos de la personalidad emprendedora y, por otro, se ha evaluado también los rasgos generalistas, aportando datos nuevos sobre las relaciones entre ambos.

En primer lugar, se presenta el modelo teórico propuesto para la evaluación de la personalidad emprendedora y se realizan diferentes pilotajes cualitativos y cuantitativos que sirven como estudio preliminar de las propiedades piscométricas de la Batería de Evaluación de la Personalidad Emprendedora (Suárez-Álvarez, Pedrosa et al., 2014). Los ítems fueron diseñados para ser fácilmente comprensibles por gente joven, utilizando un vocabulario acorde con su conocimiento y con un contenido coherente al entorno adolescente. En función del juicio de expertos se puede confirmar que las

dimensiones del modelo resultan pertinentes para evaluar la personalidad emprendedora. El alto grado de acuerdo entre los jueces sobre la pertenencia de los ítems a cada una de las escalas permite confirmar que se cuenta con una adecuada validez de contenido para evaluar la personalidad emprendedora. El estudio preliminar de las propiedades psicométricas muestra que se cuenta con una adecuada validez factorial así como una alta consistencia interna tanto en cada una de las escalas como en un factor global definido como espíritu emprendedor.

Una de las aportaciones más novedosas es la identificación y posterior comprobación empírica de que ocho rasgos de personalidad parecen conformar un perfil adecuado de la personalidad de las personas emprendedoras: *Motivación de Logro, Toma de riesgos, Autonomía, Autoeficacia, Tolerancia al Estrés, Innovación, Locus de Control Interno y Optimismo* (Muñiz et al., 2014). Tanto las diferentes escalas desarrolladas para medir estas dimensiones, como la batería completa muestran unas propiedades psicométricas adecuadas. Los coeficientes de fiabilidad de las escalas son superiores a .80, y todas ellas presentan una estructura interna esencialmente unidimensional. La batería global tiene un coeficiente de fiabilidad elevado (α = .92), y las ocho escalas conforman un factor único de segundo orden que explica el 50.32% de la varianza. Estos datos apoyan la hipótesis de que la personalidad emprendedora constituye una dimensión consistente unitaria, articulada en ocho ejes o facetas interdependientes.

Los datos obtenidos en esta Tesis Doctoral apuntan a una convergencia moderada con los Big Five de la personalidad, pues si bien la correlación canónica entre ambos grupos de variables es de .76, el coeficiente de redundancia, que indica la proporción de varianza común entre los dos tipos de variables, es de .24, lo cual indicaría que ambos enfoques comparten un 24% de varianza común. Cuando se

correlacionan las variables de ambos bloques entre sí, las correlaciones más elevadas se encuentran entre Optimismo y Estabilidad emocional (*r*= .620), Tolerancia al Estrés y Estabilidad Emocional (*r* = .626), y entre Motivación de Logro y Responsabilidad (*r* = .608). Si bien estas correlaciones se pueden considerar elevadas, habría que tener en cuenta que el resto correlaciones entre las variables son del orden de 30 o incluso inferiores (Muñiz et al., 2014). A la vista de estos datos puede decirse que ambos enfoques (rasgos específicos y rasgos generales) están correlacionados moderadamente, si bien el uno no se reduce al otro. Sólo investigaciones posteriores irán aquilatando la capacidad predictiva de cada uno de estos enfoques y su complementariedad.

En lo que respecta a la Inteligencia Emocional, las puntuaciones de las ocho dimensiones específicas del BEPE tienden a converger moderadamente con las tres dimensiones de IE evaluadas (Atención, Claridad y Reparación), hallándose una correlación canónica entre ambos bloques de variables de .70, y un coeficiente de redundancia de .16, lo que indicaría que ambos tipos de variables únicamente comparten un 16% de varianza. Las mayores correlaciones se encontraron entre Optimismo y Reparación (*r* = .615), Innovación y Reparación (*r* = .376), Autoeficacia y Reparación (*r* = .377) y entre Optimismo y Claridad (*r* = .341). Como ocurría con los rasgos de personalidad generalistas, la Inteligencia Emocional presenta una conexión moderada con los rasgos específicos de personalidad propuestos.

Por otro parte, los resultados muestran que los profesores no son muy eficaces a la hora de detectar alumnos emprendedores, pues la correlación múltiple al cuadrado entre las ocho dimensiones de personalidad emprendedora y las estimaciones hechas por los profesores fue de .385, lo cual quiere decir que los profesores sólo predicen en torno a un 13% de la personalidad emprendedora de sus alumnos. Por otro lado, la propia autoevaluación de los alumnos también obtiene una correlación modesta con las ocho

dimensiones de personalidad evaluadas, con un porcentaje de varianza asociada del 19% entre la prueba BEPE y sus auto-estimaciones globales. Estos datos ponen de manifiesto la necesidad de disponer de instrumentos de medida objetivos de la personalidad emprendedora, como el BEPE desarrollado en este trabajo, que puedan ser de ayuda para profesores y orientadores que pretendan potenciar y entrenar la capacidad emprendedora de sus alumnos.

Los resultados obtenidos en esta Tesis Doctoral resaltan la importancia de las características individuales frente a los antecedentes socioeconómicos durante la formación educativa en la adolescencia (Suárez-Álvarez, Fernández-Alonso et al., 2014). En concreto, el autoconcepto, la motivación y las expectativas son predictores significativos del rendimiento académico y tienen mayor poder predictivo que el nivel socioeconómico. Estos resultados sirven de fundamento para establecer la hipótesis de que las características individuales también tendrán un mayor poder predictivo de la conducta emprendedora que el nivel socioeconómico. Los resultados obtenidos hasta la fecha apuntan en esta dirección ya que la correlación entre los rasgos específicos de la personalidad emprendedora y una medida general de nivel socioeconómico fue muy baja (r = .126; Muñiz et al., 2014). Este dato está indicando que el nivel socioeconómico estaría explicando menos del 2% de la varianza de la personalidad emprendedora mientras que los resultados obtenidos en otras investigaciones sugieren que el Big Five de la personalidad explicaría alrededor del 13% de la varianza de la actividad emprendedora y alrededor del 10% del éxito empresarial (Zhao et al., 2010). Estos resultados están en línea con los obtenidos por Stewart, May y Kalia (2008), que no encuentran relaciones entre las variables socioeconómicas y la conducta emprendedora. Aun así, diferentes autores sugieren que el papel de un entorno familiar emprendedor puede llegar a potenciar un desarrollo personal y social orientado hacia la

conducta emprendedora (Altinay, Madanoglu, Daniele y Lashley, 2012; Schroder, Schmitt-Rodermund y Arnaud, 2011). Por otro lado, los resultados también muestran que el autoconcepto de los adolescentes obtuvo el mayor poder predictivo sobre el rendimiento académico. Estos resultados convergen en gran medida con la línea de argumentación presentada en los resultados en el informe GEM (GEM, 2015). La percepción de conocimientos y habilidades es uno de los aspectos fundamentales sobre los que incide el informe GEM por su conexión con la conducta emprendedora. Por otro lado, los resultados presentados en esta Tesis Doctoral muestran la existencia de una relación moderada entre los rasgos específicos de la personalidad emprendedora y las notas en matemáticas (r = .362) y lengua (r = .513). Las dimensiones de la personalidad más relacionadas con el rendimiento académico fueron, como cabría esperar, la motivación de logro (r = .23 con matemáticas y r = .24 con lengua) y la autonomía (r = .32 con matemáticas y r = .37 con lengua). Resultados que a su vez convergen con los encontrados en otras investigaciones que resaltan la importancia del trabajo autónomo sobre el rendimiento académico (Fernández-Alonso, Suárez-Álvarez y Muñiz, 2015; Fernández-Alonso, Suárez-Álvarez y Muñiz, en prensa). En realidad, parece razonable pensar que la moderada relación encontrada entre los rasgos de la personalidad emprendedora y el rendimiento académico se explique por la importancia que determinados rasgos de personalidad (p.e. motivación y autonomía) tienen sobre el rendimiento académico más que por su conexión con el espíritu emprendedor global. De hecho, una reciente investigación ha demostrado que la formación específica en espíritu emprendedor no incrementa el rendimiento académico general (Johansen, 2014). Estos hallazgos tienen una considerable importancia aplicada en la medida que aporta conocimiento sobre lo que puede ayudar en el diseño de programas para la educación y formación en habilidades emprendedoras en jóvenes. La principal razón es que una

formación orientada a emprender incrementaría las competencias, conocimientos y habilidades de las personas para aprovechar adecuadamente las oportunidades respecto a los que no reciben este tipo de formación (Unger, Rauch, Frese y Rosenbusch, 2011; Volery, Muller, Oser, Naepflin y del Rey, 2013).

Las publicaciones presentadas a lo largo de esta Tesis Doctoral han permitido ir puliendo los instrumentos de medida y han dado lugar a las principales conclusiones obtenidas. Por ejemplo, se presentan nuevas evidencias de validez del Trait Meta-Mood Scale-24, uno de los instrumentos más utilizados para evaluar inteligencia emocional percibida (Pedrosa et al., 2014). Hasta la fecha, no existen resultados de su funcionamiento en población adolescente española desde el marco de los modelos de Teoría de Respuesta a los Ítems. Los resultados permiten apoyar una estructura factorial compuesta por tres dimensiones (i.e. Claridad, Reparación y Atención) en una amplia muestra de adolescentes españoles y separadamente para hombres y mujeres. Una de las aportaciones más interesantes de este artículo es la utilización de modelos de TRI, los cuales permiten análisis más precisos de las propiedades psicométricas de los instrumentos de medida (De Ayala, 2009; Hambleton, Swaminathan y Rogers, 1991). En el caso de los resultados obtenidos en esta investigación, la Función de Información muestra que el TMMS-24 evalúa de forma precisa a personas con puntuaciones bajas y medias en inteligencia emocional percibida. En cambio, la precisión del instrumento se reduce cuando se evalúan personas con puntuaciones muy altas. La principal contribución de este artículo a la tesis doctoral es proporcionar evidencias de validez del TMMS-24 para evaluar inteligencia emocional percibida en adolescentes españoles. Aspecto que resulta fundamental para poder estudiar la relación que tiene la inteligencia emocional con la personalidad emprendedora (Muñiz et al., 2014).

Finalmente, se presentan nuevas evidencias de validez que permiten apoyar empiricamente la bidimensionalidad del locus de control (Suárez-Álvarez et al., en prensa). Además, existen evidencias de validez transcultural entre España, Chile y Reino Unido en relación con la invarianza bifactorial del locus de control (Suárez-Álvarez, García-Cueto, Pedrosa y Muñiz, en prensa). Esto supone que una misma persona pueda realizar atribuciones externas e internas en función de las circunstancias, aspecto que además resulta sensato desde un punto de vista teórico. La idea subyacente es que una persona puede atribuir que la causa de una determinada conducta depende de uno mismo pero al mismo tiempo tener en cuenta el papel que juega el azar en dicha conducta. Estos resultados tienen importantes implicaciones en el contexto del espíritu emprendedor. Por ejemplo, en el caso de la persona emprendedora, la realización de atribuciones internas está asociado con el éxito empresarial (Rauch y Frese, 2007a, 2007b). Los datos presentados en esta Tesis Doctoral van en esta dirección; las valoraciones de los expertos identificaron el locus de control externo como la variable que peor representaba a la persona emprendedora (Suárez-Álvarez, Pedrosa et al., 2014). En función de estos resultados y del bajo peso factorial obtenido en el pilotaje se decidió eliminar esta variable del modelo y los trabajos posteriores sólo incluyen el locus de control interno como variable fundamental de la personalidad emprendedora (Muñiz et al., 2014). Los resultados muestran que rasgos característicos de la persona emprendedora como la autoeficacia, la motivación de logro y el optimismo correlacionan positivamente con el locus de control interno (Suárez-Álvarez et al., en prensa). En resumen, se dispone de un instrumento con unas adecuadas propiedades psicométricas para evaluar locus de control en población española. Además, no se detectó funcionamiento diferencial en función del sexo en ninguno de los ítems que componen el cuestionario.

En suma, se han identificado ocho rasgos específicos de personalidad (*Motivación de Logro, Toma de riesgos, Autonomía, Autoeficacia, Tolerancia al Estrés, Innovación, Locus de Control Interno y Optimismo.*), que permiten establecer un perfil de la personalidad emprendedora en jóvenes. Se ha desarrollado la batería BEPE que mide de forma fiable estas dimensiones, y se aportan diferentes evidencias de validez que permiten ir avanzando en la validación del modelo propuesto. Disponer de un instrumento de medida de este tipo ayudará a la detección de jóvenes con inclinaciones emprendedoras, y a diseñar programas de formación encaminados a mejorar sus capacidades emprendedoras, en la línea con algunos de los programas de formación ya existentes (Chandler, DeTienne, McKelvie y Mumford, 2011; Peterman y Kennedy, 2003; Sánchez, 2011b, 2013; Souitaris, Zerbinati y Al-Laham, 2007).

Los resultados que se presentan en esta Tesis Doctoral hay que valorarlos teniendo en cuenta algunas limitaciones y que dan lugar a las principales líneas de futuro (Suárez-Álvarez y Pedrosa, en prensa). En primer lugar, es necesario ir acumulando evidencias de validez (Lane, 2014; Padilla y Benítez, 2014; Rios y Wells, 2014; Sireci y Faulkner-Bond, 2014) que avalen la capacidad predictiva de la batería desarrollada, éste es un proceso largo en el tiempo y ya se ha empezado a dar los primeros pasos en esa dirección. La principal meta sería que el instrumento permita discriminar entre emprendedores potenciales y población general y sirva como predictor tanto de la creación como del éxito empresarial. Para ello sería necesario adaptar y validar el instrumento a población adulta y establecer diferentes criterios. Por ejemplo, se podrían identificar como criterios los estándares establecidos por el proyecto GEM (Figura 2): *emprendedor potencial*, persona con intención de emprender en los próximos tres años; *emprendedor naciente*, iniciativas que se hallan en fase de despegue y que no han pagado salarios por más de tres meses; *emprendedor nuevo*, iniciativas que

se hallan en fase de consolidación entre 3 y 42 meses de actividad económica; *emprendedor consolidado*, empresas que han superado las fases anteriores y llevan más de 42 meses operando en el mercado. Por otro lado, se ha solicitado a los participantes información de contacto con la intención de realizar un seguimiento y evaluar en diferentes momentos aspectos relacionados con la conducta emprendedora. La posibilidad de obtener datos longitudinales permitiría proporcionar evidencias del papel que juega la personalidad en el proceso emprendedor.

En segundo lugar, los datos recogidos en esta Tesis Doctoral fueron obtenidos mediante autoinforme. Esta metodología supone asumir el riesgo de que la persona distorsione su propia respuesta para ajustarse a un perfil determinado (i.e., deseabilidad social). Este tipo de sesgos en las respuestas, especialmente en tests de personalidad y con importantes consecuencias para las personas, afectarían directamente a la validez de las decisiones que se tomen en función de las puntuaciones obtenidas en los instrumentos de medida. Para solucionar la problemática se han propuesto diferentes alternativas entre las que destaca los ítems de elección forzada, donde las personas deben elegir entre dos ítems con similar deseabilidad social (Brown y Maydeu-Olivares, 2012). Un buen ejemplo de este tipo de instrumentos de medida en el contexto de la personalidad podrían ser el WorkFORCE (Naemi, Seybert, Robbins y Kyllonen, 2014) que evalúa ajuste al perfil laboral y el TAPAS (Stark et al., 2014) para selección de personal en el contexto militar, ambos desarrollados por el *Educational Testing Service*. Cara al futuro sería deseable complementar este tipo de datos con otros provenientes de fuentes ajenas al propio individuo (Benítez, Padilla y Ongena, 2012), tests situacionales (Olea, Abad y Barrada, 2010) o pruebas de asociación implícita (Greenwald, Poehlman, Uhlmann y Banaji, 2009). Por ejemplo, los Test de Asociación Implícita permiten evaluar actitudes y creencias mediante la fuerza de la asociación automática entre las

representaciones mentales de los conceptos en la memoria (Greenwald et al., 2009). Otra de las alternativas más interesante en la actualidad es la llevada a cabo por el Centro Psicométrico de la Universidad de Cambridge. Entre sus últimos hallazgos se encuentra que los juicios de personalidad basados en ordenadores (i.e. indicadores obtenidos a través de redes sociales como Facebook o Twitter) son más precisos y válidos que los realizados por los seres humanos (Youyou, Kosinski y Stillwell, 2015).

En tercer lugar, los datos fueron analizados desde modelos unidimensionales de TRI. Las líneas futuras de investigación estarán destinadas a la implementación de modelos multidimensionales de Teoría de Respuesta a los Ítems (MIRT) y el desarrollo de una versión adaptativa informatizada. En la actualidad, se han realizado importantes avances en esta dirección, ya se dispone de una versión adaptativa informatiza para la evaluación de la personalidad emprendedora desde modelos unidimensionales (Pedrosa, Suárez-Álvarez, García-Cueto y Muñiz, 2015). Se espera que la implementación de modelos MIRT permita incrementar la precisión de las estimaciones en comparación con los modelos unidimensionales, reducir la longitud del test y proporcionar puntuaciones en cada dimensión (Ackerman, Gierl y Walker, 2003; Reckase, 2009). Si estos objetivos se consiguen se abriría la posibilidad de crear un perfil de la personalidad emprendedora desde la aproximación de la TRI.

Por último, los datos aportados aquí sobre la personalidad emprendedora constituyen una pequeña faceta de una línea de investigación mucho más amplia que trata de comprender la conducta emprendedora, y en la que juegan un papel fundamental las variables de carácter contextual, biográfico y cognitivo, además de las relativas a la personalidad tratadas aquí. Dentro de los aspectos contextuales cabe subrayar los culturales (Cheng, Cheung, Chio y Chan, 2012; Hisrich, 2015). Desde el punto de vista biográfico, establecer la influencia del ambiente familiar en la actitud

emprendedora y en lo relativo al dominio cognitivo hay que aclarar el papel que juegan, variables como la inteligencia y la creatividad, entre otras, en la conducta emprendedora. Queda mucho por hacer en este campo, cara al futuro se presenta el reto de encajar todas estas piezas y plantear modelos integrales que den cuenta de la actividad emprendedora, en la línea de los propuestos por Rauch y Frese (2007a, 2007b).

5. Conclusiones

A continuación se enumeran las principales conclusiones obtenidas a partir del conjunto de publicaciones incluidas en esta Tesis Doctoral:

- Se ha propuesto un modelo integral y comprensivo sobre el espíritu emprendedor, tiene un carácter multidimensional y depende tanto de aspectos contextuales (sociedad, cultura, situación económica, etc) como de las características personales (aptitudinales y de personalidad). En lo que respecta al ámbito personal, se han identificado ocho dimensiones específicas de la personalidad emprendedora en jóvenes: Motivación de logro, autoeficacia, toma de riesgos, innovación, autonomía, tolerancia al estrés, locus de control interno y optimismo.
- En función del modelo propuesto, se ha desarrollado un Banco de Ítems formado inicialmente por 161 ítems que evalúa de forma rigurosa y exhaustiva los ocho rasgos específicos de la personalidad emprendedora.
- El Banco de Ítems cuenta con unas adecuadas propiedades psicométricas para la evaluación de la personalidad emprendedora en jóvenes.
- La Batería para la Evaluación de la Personalidad Emprendedora (BEPE) está compuesta por 87 ítems, cuenta con una adecuada fiabilidad y muestra múltiples evidencias de validez para evaluar la personalidad emprendedora en jóvenes españoles.

4. Conclusions (bis)

Below are listed the main conclusions obtained from the set of publications included in this Doctoral Dissertation:

- An extensive and comprehensive model of entrepreneurship was proposed; it is multidimensional and depends on contextual aspects (society, culture, economics, etc) as well as personal attributes (aptitudes and personality). Regarding to the personal sphere, eight specific dimensions of the enterprising personality in young people have been identified: Achievement motivation, self-efficacy, risk-taking, innovativeness, autonomy, stress tolerance, internal locus of control, and optimism.
- Based on the proposed model, an item bank was developed comprising 161 items that rigorously evaluates the eight specific traits of enterprising personality.
- The item bank demonstrated adequate psychometric properties for the assessment of enterprising personality in young people.
- The Battery for the Assessment of Enterprising Personality (BEPE) is composed of 87 items, it has adequate reliability, and validity evidence was gathered from different sources for the assessment of enterprising personality in young Spanish people.

Como colofón:

Las conclusiones obtenidas en esta Tesis Doctoral tienen beneficios tanto teóricos como prácticos.

Desde el punto de vista teórico, se dispone de un modelo integral del espíritu emprendedor que recoge los principales hallazgos encontrados hasta la fecha y permite establecer un perfil de la personalidad emprendedora en jóvenes. Disponer de un modelo con estas características servirá de esqueleto sobre el que articular futuras investigaciones y aumentar el conocimiento sobre el fenómeno emprendedor.

Desde el punto de vista práctico, se dispone de la Batería para la Evaluación de la Personalidad Emprendedora (BEPE) para evaluar de forma fiable los rasgos de personalidad propuestos en el modelo y se han acumulado múltiples evidencias de validez para su uso en población joven. Disponer de un instrumento de medida con estas características ayudará en la detección temprana de jóvenes emprendedores así como en el diseño de programas de formación para mejorar las habilidades emprendedoras.

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