

# Psychosocial profile of gifted adolescents attending a public high school

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## Abstract

**Introduction.** The current models in the study of giftedness such as the Triadic Interdependence define it as a favorable outcome of the interaction between intrinsic (intellectual capacity, creativity and motivation) and extrinsic (family, peers, and school) factors. Based on this, the purpose of this study was to identify and establish a profile of gifted adolescents that includes both intrinsic and extrinsic characteristics, as well as to analyze the relationships and the differences between these characteristics within the resulting group of the profile.

**Method.** Participants were 666 students from a public school, age ranged between 12 to 18 years, and the mean of age was 14.77. Various statistical analyzes were performed such as Pearson's correlation, Student's *t*-test and ANOVA test to compare the possible similarities and differences between intrinsic and extrinsic characteristics of students identified as gifted.

**Results.** 93 out of 666 students were found to meet the criteria established in the literature to be considered as gifted. The collected data allowed us to establish both a general profile of the group and a more specific profile based on feature grouping. In both cases it was possible to determine every group's homogeneity and heterogeneity with regard to the presence of intrinsic and extrinsic characteristics, as well as the relationships between them.

**Discussion.** The findings highlight that although gifted adolescents are a heterogeneous population, which shares some intrinsic and extrinsic characteristics, they differ in others depending on giftedness degree, and this should be taken into account when designing educational programs that meet both their internal and environmental needs so they can develop successfully in higher education levels.

**Keywords:** giftedness, creativity, intellectual capacity, academic self-concept.

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# Perfil psicosocial de adolescentes con aptitudes sobresalientes de un bachillerato público

## Resumen

**Introducción.** Los modelos actuales abocados al estudio de las aptitudes sobresalientes como el de la Interdependencia Triádica, definen a éstas como el resultado favorable de la interacción entre factores intrínsecos (habilidad intelectual, creatividad y motivación) y extrínsecos (familia, amigos y escuela). Al tomar en cuenta lo anterior el objetivo del presente trabajo consistió en identificar y establecer un perfil de adolescentes con aptitudes sobresalientes en el que se incluyeran tanto características intrínsecas como extrínsecas así como analizar las relaciones y las diferencias respecto de estas características al interior del grupo resultante en dicho perfil.

**Método.** La muestra estuvo constituida por 666 alumnos de una escuela pública, las edades fluctuaron de 12 a 18 años con una media de 14.77. Se realizaron diversos análisis estadísticos como correlación de Pearson, *t* de Student y ANOVA para contrastar las posibles relaciones y diferencias de las características intrínsecas y extrínsecas de los alumnos identificados con aptitudes sobresalientes.

**Resultados.** De los 666 alumnos se encontró que 93 de ellos cumplían con los criterios establecidos en la literatura para ser considerados con aptitudes sobresalientes. Los datos obtenidos permitieron por un lado, establecer el perfil general del grupo y por otro, un perfil más específico, según la agrupación de las características. En ambos casos se pudo apreciar tanto la homogeneidad como heterogeneidad de cada grupo con respecto tanto a la presencia de las características intrínsecas y extrínsecas como a las relaciones entre ellas.

**Discusión.** Los hallazgos ponen de manifiesto que los adolescentes con aptitudes intelectuales sobresalientes constituyen una población heterogénea, que si bien comparten ciertas características tanto intrínsecas como extrínsecas, difieren en otras, según los niveles de sobresalencia, lo cual deberá tomarse en cuenta al diseñar programas educativos que puedan cubrir sus necesidades tanto internas como del medio que los rodea, para que puedan desarrollarse exitosamente en los niveles de educación superior.

**Palabras claves:** sobresalencia, creatividad, capacidad intelectual, autoconcepto académico.

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## Introduction

All throughout history, individuals showing outstanding potential have excelled at cultural, artistic, and scientific fields, a circumstance that places them in a special social standing. But conceptualization and definition of this kind of potential have changed over time together with the evolution of the models explaining which characteristics and attributes should be taken into account when characterizing gifted individuals according to their sociocultural needs (Monreal, 2000).

It is important to stress that no model has been replaced, but rather developed further with more relevant information, from one-dimensional models centered on IQ measurements to current comprehensive models focused both on the cognitive and the socioemotional area. The latter are relevant in this study because these factors may have a positive or negative effect on gifted adolescents' performance and potential.

Since 1986, the Ministry of Public Education (in México *Secretaría de Educación Pública*, SEP) started the implementation of educational activities for attending gifted children in the elementary school with the Assistance for Gifted and Talented Children and Youth Project (in Spanish *Proyecto de Atención a Niños y Jóvenes con Capacidades y Aptitudes Sobresalientes*<sup>1</sup>, CAS), which later expanded to preschool and middle school (SEP, 2006; Zavala & Rodríguez, 2004). However, some states, such as Mexico City have recently introduced this program, in which gifted students are identified only as having a grade average<sup>2</sup> of 9 or more (Mexico City Department of Education [in Spanish *Secretaría de Educación de la Ciudad de México*, SECM], 2008). Nevertheless, we found a decrease of assistance levels provided to these students over time; for example, during the 2007–2008 school courses, only 0.57% of gifted children in elementary school were served (SEP, 2008). Therefore, these results highlights that not only there is a limited detection of gifted students at elementary education level—and that it is non-existent at higher levels—, but also shows the contrast between what policies states and what actually happens within classroom.

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<sup>1</sup> Official term used for referring to the gifted and talented in Mexico.

<sup>2</sup> In Mexico, school grades are measured from 0 to 10.

In this context, identification and characterization of gifted adolescents prove to be fundamental for multiple reasons. First, since the 80's the Mexican Education System has focused on assisting gifted children only through elementary school, neglecting them when they reach middle school (Puga, 2004), and leaving them without any kind of assistance when entering adolescence, a stage that according to Mönks (2008) may be more critical for gifted students than for any other person due to their particular characteristics, such as extremely high sensitivity and perfectionism.

Second, giftedness is not static and can be affected by factors such as age, gender, socio-economic status (Mönks, 2008; Zacatelco & Acle, 2009; Zavala, 2004), or it may even be latent and not manifest (Castelló & Batlle, 1998). Consequently, it has not always been possible to detect giftedness during early development stages, as may have been the case of Einstein, Freud, Picasso, among others who did not stand out during childhood but rather during adolescence or adulthood (Gardner, 1995). In this regard, Preckel, Goetz, Pekrun and Klein (2008) found that in Germany 44% of students from 11 to 15 years old of age attending a Gymnasium had not been detected early.

Likewise, research on designing instruments for the identification of these students in Mexico has mainly focused on the screening of gifted children in elementary school (Covarrubias, 2001; Zacatelco, & Acle, 2009; Zavala, 2004) and has overlooked the validation and reliability of instruments for the gifted adolescent population (Ordaz & Acle, 2010). Finally, the giftedness potential identification in students at this stage is relevant as well for the future vocational guidance we can offer them according to their own interests and high abilities as well to our own country because, fostering this outstanding potential in youth will become a human resource to contribute in solving different difficulties presents now (Armenta, 2008; Ordaz & Acle, 2010).

Keeping in mind that giftedness development is a dynamic phenomenon, dependent on individual and environmental changes (Mönks, 1996), studying adolescent giftedness through psychosocial models, particularly Mönks and Boxtel's Triadic Interdependence, is deemed to be relevant since these authors take dynamism into account when defining giftedness as a favorable interaction between intrinsic (intellectual ability, creativity, and motivation) and extrinsic (fami-

ly, peers, and school) factors. Intrinsic factors according to the authors are exceptional intellectual capacity, creativity, and motivation (Mönks & Boxtel, 1985).

Intellectual capacity includes both general and specific abilities (Renzulli, 1978, 1994). General intellectual abilities refer to the capacity to process information; to integrate experiences so that appropriate and adaptive responses originate in new situations, and the capacity to engage in abstract thinking (Renzulli, 1978, 2002). These types of abilities are measured by intelligence tests, and individuals with IQs within 5 to 10% upper their reference group are considered at the highest level (Mönks, 2008). Specific intellectual abilities show the specific way in which knowledge is acquired, the pattern or ability acquisition to execute one or more specialized activities (Renzulli, 1978, 2002; Mönks, 2008).

Creativity is defined as the process of becoming sensitive to problems, deficiencies, gaps and missing elements in knowledge and identifying the difficult (Mönks, 2008; Torrance, 1962; Torrance, Ball & Safter, 2008). A creative person not only searches different solutions for a problem, but also turns away from the path to find problems (Getzels, 1981; Guilford, 1967; Landau, 1987). Finally, motivation means that an individual has a strong draw to a given task or object and takes pleasure in working on it, and has a high short-term and long-term planning capacity (Mönks, 2008).

Based on Renzulli's model (1978, 1994), Mönks (2008) illustrates these three components as three intersecting rings, and the author explain that the gifted are those who possess or are able to develop this set of characteristics, not necessarily those who show them (Renzulli, 2002). This last point is of great importance for two reasons: Ferrando, Prieto, Ferrándiz and Sánchez (2005) state that intelligence and creativity are independent abilities. Moreover, Simonton (1994) and Sternberg (1996) suggest that very high IQs may hinder creativity. Conversely, Covarrubias (2001) and Monreal (2000) state that high achievers such as Einstein or Picasso show peaks and valleys in their creativity and motivation; that is that creativity and motivation fluctuate easily and go through increases and decreases. And thus some identification methods are based only on IQ, as it is considered static and unchangeable (Covarrubias, 2001; Rayo, 1997; Rojo, 1999).

Nonetheless, other authors hold that IQ measurements themselves must not be considered the only standard for determining whether a student is gifted or not, and that creativity is an essential characteristic for identification; therefore, incorporating creativity in the detection and assessment processes is advisable (Castejón, Prieto y López, 2000; Castelló, 1993; Castelló y Batlle, 1998; Genovard y Castelló, 1990; Genovard, Gotzens, Castelló, González y González, 1992; Guilford, 1977; Landau, 1997; Mönks, 2008; Mönks y Boxtel, 1985; Renzulli, 2002; Torrance, 1984; Zacatelco, 2005; Zavala, 2004). Moreover, several studies have demonstrated that another intrinsic characteristic of gifted adolescents is self-concept (Feldhusen, 1986; Mönks, 1996; Boxtel & Mönks, 1992), specially in relation to the academic field since it influences significantly the proper functioning of the cognitive field (González-Pineda, Núñez, González-Pumariega & García, 1997; Mönks, 1996; Santana, Feliciano & Jiménez, 2009; Tannembaum, 1983) and affects directly and considerably students' school learning (Vidals, 2005), achievements, and expectations (Amezcuca & Fernández, 2000; Broc, 2000; Henson & Heller, 2000; Möller & Pohlman, 2010; Musitu, García & Gutiérrez, 2002), and this in turn helps them to create numerous cognitive and self-organization strategies for their school learning (González-Pineda *et al.*, 1997; Monereo, Castello, Clariana, Palma & Pérez, 1994). Accordingly, Feldhusen (1986), Mönks and Boxtel (1985) suggest that self-concept should be considered as one of the key variables for gifted students detection.

Academic self-concept comprises perception and evaluation of a student's academic abilities (Cokley, 2000; House, 1992; Marsh & Rhonda, 2002; Schunk, 1991), that is the approval or disapproval of their academic achievement expectations (Herrera, Ramírez, Roa & Herrera, 2004). Studying academic self-concept of gifted students is relevant for several reasons: gifted students show a high academic self-concept, compared to a non-academic one (Boxtel & Mönks, 1992; Hoge & Renzulli, 1993); in addition, these students show a higher academic self-concept than non-gifted peers (Boxtel & Mönks, 1992; Galindo, Martínez & Arnáiz, 1999; Herrera *et al.*, 2004; Peñas, 2008).

There is, however, no difference between self-concept of gifted males and females (Kelly & Colangelo, 1984). Similarly, no differences between academic self-concept within different grades—high, average, and moderate—of giftedness have been found either (Brody & Benbow,

1986). Finally, this construct has been found to remain stable over time (González-Pineda *et al.*, 1997; Peñas, 2008). Consequently, it is evident that self-concept can be a sign for gifted students identification and characterization.

Although Gagné (1991), Tannenbaum (1997), Mönks and Boxtel (1985) note the importance of intrinsic characteristics, they also describe extrinsic or environmental characteristics as essential components involved in human psychological development, especially in giftedness potential development. Extrinsic factors according to Mönks and Boxtel (1985) are: school, family, and peers.

In regard to school, López (2003) explains that the gifted generally obtain good academic grades. Nevertheless, as learning processes and resources for them may differ widely from those of their classmates (Genovard, Gotzens, Badia & Dezcallar, 2010; Genovard, *et al.*, 1992) and the education system does not provide them with supporting elements that would allow them to improve and further develop knowledge appropriate for their level, gifted students are likely to show a tendency toward idleness, apathy, and intellectual laziness, even resulting in becoming individuals at risk of school failure (Acle & Ordaz, 2010; Alonso & Benito, 1996). However, Moriana, Alós, Alcalá, Pino, Herruzo and Ruiz (2006) found that students who perform extracurricular activities show a higher educational level, more abilities, and aspirations.

Regarding family, López (2003) suggests that it globally fosters personality development of individuals, as well as specific aspects of development, such as thought, language, and attachment. Likewise, the author explains that members interact within a family, setting goals and behavior models, as well as mutual guidance, motivation, and support. Common characteristics within gifted students' families are reported. Gross (1993), Silverman and Kearney (1988), Snowden and Christian (1997), Terman (1925), Zacatelco and Acle (2009) noticed that most individuals were only children or the older sibling, and that families were small, with an average of two children. In addition, it has been found that most parents achieved a higher level of education than general population parents (Gross, 1993; Gottfried, Eskeles, Bathurst & Wright, 1999; Renzulli & Park, 2000; Silverman & Kearney, 1988; Snowden & Christian, 1997; Terman, 1925), and families engaged children in cultural, intellectual, and sports activities (Gross, 1993;

Gottfried *et al.*, 1999; Snowden & Christian, 1997). In fact, Lozano (2003) adds that the family factors that most influence academic performance and learning are social class and family atmosphere.

Accordingly, Moriana *et al.* (2006) state that parents' expectations affect school success; gifted students' parents, however, have different expectations on their children based on their gender. For instance, Dickens and Cornell (1993), Olszewski and Yasumoto (1995), Preckel *et al.* (2008) noticed that many female adolescents with high academic abilities show a poor self-concept for their mathematical abilities (cancelled by other areas) and have negative expectations about associated future events. A possible explanation for their low academic self-concept in mathematics may be adverse parent influence; i.e., authors found that parents did not expect their daughters to be as good in mathematics as their sons. However, Alonso and Benito (1996) note that an increased natural separation from family occurs during adolescence, when relationships with friends and classmates become more important. Therefore, friendship provides adolescents the opportunity to share experiences and learn to face up to the problems that may arise. Nonetheless, Robinson and Olszewski-Kubilius (1997), Rodríguez (2002) and Valadez (2004) found that when entering adolescence, gifted females only develop partly their potential and reduce their aspirations because they fear social isolation and rejection, which according to them are related to achievement. This means that gifted females give more importance to social success than to professional one, and their eagerness to belong is often stronger than their will to develop accordingly to their own needs (Coriat, 1990; Landau, 2003; Peñas, 2008; Reis, 2003, Reis & Renzulli, 2004). It is important to point out that Freeman (2004) notes that this does not necessarily happen in every culture. She found that in Great Britain female gifted adolescents attain better academic achievements than gifted males, not only in social sciences but also in mathematics and science.

Characteristics, both intrinsic and extrinsic, common to the gifted are multiple and diverse, as may be seen (Landau, 1997). However, it is important to recall that students are involved in several environments where they play different roles, and they are expected to behave differently in each one (Kauffman, 1995). Thus it is crucial to analyze the way gifted people de-

velop and perceive themselves and their environment during adolescence in order to characterize their behavior.

### *Purpose*

Since gifted adolescents in Mexico are not detected during middle school or high school, and consequently a profile of this type of students that could help to give them the academic support they require as gifted does not exist, the purpose of this study is to establish a profile including both intrinsic and extrinsic characteristics within a gifted adolescent group.

## **Method**

### *Participants*

The sample was not probabilistic. It consisted of 666 participants, 273 of which were males (41%) and 393 were females (59%), between 12 and 18 years old (mean 14.77 and SD 1.769), 314 of them in middle school (47.1%) and 352 in high school (52.9%). As for other environmental data, 53% of participants reported to have extracurricular activities, sports being the favorite. Participants reported to have 0-7 siblings, with an average of 2; 52% reported to be firstborns; 35% of mothers and 37% of fathers claimed to have a high school level of education.

### *Instruments*

*Advanced Progressive Matrices Test* (Raven, 1993). Advanced Progressive Matrices (APM) is a nonverbal test used to measure general intellectual ability. This scale consists of two independent booklets presenting set I (12 items) and set II (36 items, which in turn are divided into 3 sets) respectively. Set I is used to acclimate subjects to item format and to train them in the method.

Set II can be used to distinguish individuals with higher intelligence levels by one of the following modes: assessment of observation and reasoning abilities with no time limit or intellectual capacity assessment with a time limit (40 minutes). Each item shows a matrix of incomplete, abstract designs with progressive difficulty. The goal is to select the right choice between eight figures in order to complete each design vertically, and horizontally as well. The test must be

completed by elaborating analogies and discovering the law or series underlying every problem through composition and arrangement of different patterns.

As for reliability, Raven, Court and Raven (2008) mention that this test showed high test-retest reliability .91 for British adults with above-average intellectual capacity; in relation to construct validity through a factor analysis, a g-saturation of .82 was found. In Mexico, Méndez-Sánchez and Palacios-Salas (2001) conducted a study to obtain scales for adolescents and adults in Aguascalientes City, Aguascalientes, finding scores similar to the ones reported by Raven, Court y Raven (1993).

*Creative Thinking Test of Figural TTCT* (Torrance, 2008a). This test was developed by Torrance and his associates in 1966, and it has been revised several times: 1974, 1984, 1990, 1998, and 2008. It consists of two independent tests: the Verbal TTCT and the Figural TTCT, each with two parallel forms, A and B, which can be used to pretest and posttest. This study used the A figural version, the purpose of which is to assess creative output through drawing composition. It assesses the following creativity dimensions (Torrance, Ball & Safter, 2008): fluency, originality, elaboration, resistance to premature closure and abstractness of title.

Fluency refers to the number of ideas that an individual expresses through interpretable stimulus-based relevant responses. Originality is based on the statistical rarity of responses within a given culture. Elaboration is the capacity to carefully deepen an idea, which is measured by the number of detail subjects add to their drawings in order to embellish, improve, or develop their ideas. Resistance to premature closure occurs when a creative individual is able to remain open, put up with ambiguity, and delay opinion enough to allow for mental leaps, which are related to the generation of original ideas and entail the assimilation of every piece of available information. Finally, abstractness of title is the ability to create abstract titles involving thought processes such as analysis, synthesis, and organization; i.e. it is the ability to capture the essence of concerning information to portray the most important elements. As per Figural TTCT Norms-Technical Manual (Torrance, 2008b), the reliability coefficient for the creative index is .985. Reliability for each component is: fluency .999, elaboration .957, resistance to premature closure .966, originality .974, and, lastly, abstractness of title .967.

*Academic Self-Concept Scale* (Ordaz, Reyes-Lagunes & Acle, 2009). The purpose of this test is to identify low and high levels of academic self-concept. It consists of 28 items, with a Cronbach's alpha of 0.897, divided into 5 factors: creativity, motivation, general intellectual abilities, perfectionism, and specific intellectual abilities. It has five response choices, from "never", marked number one, to "always", marked number five. It is based on the premise that subjects will respond affirmatively to the sentences in the scale and tend to show high academic self-concept in the above-mentioned areas; otherwise, a subject who responds negatively to the sentences will have low academic self-concept. The identification sheet includes 20 questions aimed at obtaining information about extrinsic data such as birth order, parents' level of education, socioeconomic status, and areas where abilities are used (dance, written language, leadership, mathematics, drawing, spoken language, memory, sports, social relationships, and music).

### *Procedure*

The sample was taken from a public school belonging to the National Autonomous University of Mexico (Universidad Nacional Autónoma de México in Spanish), which offers lower- and upper-secondary education within the same facilities. The school population consists mainly of the children of workers and teachers of said institution. Additionally, it is important to include the following annotations regarding this school: 1) the requirement for entering lower-secondary school is to have a high elementary school final grade average; 2) most upper-secondary school students are admitted after passing a general knowledge exam; 3) students who enter the lower- or the upper-secondary school obtain an "automatic pass" to the university; 4) population is heterogeneous in terms of background, since students come from different parts of the metropolitan area, i.e., different boroughs of Mexico City and some municipalities of the State of Mexico.

Informed consent for the administration of these instruments was requested both to school authorities and group teachers and participants, who were in the classrooms with their teachers. Administration was completed in two counter-balanced sessions. In the beginning, students were provided with a brief explanation about how purposeful and important responding the questionnaires was and were asked for their approval. During the first session, set I and set II of the APM test booklets, as well as their answer sheets, were delivered, and the Progressive Matrices Ad-

vanced Scale was followed. When the 40 minutes were over, students were asked to complete the Academic Self-Concept Scale, which took about 15 minutes.

During the second session, the purpose of responding the questionnaires was briefly explained again, and each subject was handed a Figural TTCT test booklet, consisting of three activities: picture construction, drawing completion, and finally lines. The norms of Torrance's test (2008) were followed at all times; accurate instructions were provided, and ten-minute time limits were specified for each subtest, to amount to 30 minutes, as specified by the author. A great effort was made to maintain a comfortable, stimulating psychological environment before and during test administration.

### *Statistical Analyses*

Data collected with the SPSS 19 program was captured, evaluated, and analyzed statistically. In order to identify gifted adolescents, minimum and maximum scores obtained by the participants were taken into account, and so was the fact that the detection process must be based on a wide, flexible concept so as to allow a wide range of subjects with diverse cultural, social, and racial characteristics to be identified (Callahan, Hunsaker, Adams, More & Bland, 1995; Castelló & Batlle, 1998; Frasier & Passow, 1994; Richert, 1997) and to not mistakenly rule anyone out (Richert, 1997; Tourón, Peralta & Repáraz, 1998). Therefore, a cutoff for intellectual capacity—and at least one of the other intrinsic characteristics—of 75 percentile was used (Castelló & Batlle, 1998; Martínez & Castelló, 2004; Zacatelco & Acle, 2009).

Since intellectual resources are specific to each individual, Armenta (2008), Castelló and Batlle (1998) suggest the use of different profiles. To establish a profile of gifted adolescents in this study, statistical analyses were performed and divided chiefly into two sections:

The first section is a general profile of a gifted adolescent. In order to know the associations between intrinsic and extrinsic characteristics, a Pearson's correlation coefficient was calculated. Subsequently, gender differences were determined with the Student's *t*-test, while the influence of the interaction between gender and education level (lower- and upper-secondary school) variables related to intrinsic and extrinsic characteristics, was analyzed using a two-way ANOVA test.

The second section is a group profile. Three groups were formed according to the areas where they scored above 75 percentile. Then the Pearson's correlation coefficient was used to know the degree of association between each group's intrinsic and extrinsic characteristics. In order to determine the differences between intrinsic and extrinsic characteristics by group, a one-way ANOVA test was performed. Finally, a two-way ANOVA test was also performed with the purpose of finding the gender differences related to intrinsic and extrinsic data by group.

## Results

In order to characterize gifted adolescents, minimum and maximum scores of administered instruments were taken into consideration: Advanced Progressive Matrices (APM), Torrance's Tests of Creative Thinking (TTCT), and Academic Self-Concept Scale (ASS). Said scores were provided according to groups, which were determined by age. Based on established criteria (scores above 75 percentile in intellectual capacity, and also in at least one of the other criteria), 93 of 666 students were found to be gifted. These 93 students represent 14% of the sample, 47 of which were male and 46 female.

To describe the general profile of gifted adolescents, relationships between the administered instruments were determined using a Pearson's correlation. This showed, on the one hand, a sole association, which was negative, in the test between creativity and academic self-concept ( $r = -.495, p < 0.01$ ), and, on the other hand, no associations between intrinsic and extrinsic characteristics; i.e. there were no associations between intellectual capacity, creativity, or academic self-concept and birth order, the mother's level of education, the father's level of education, and extracurricular activities whatsoever.

Regarding extrinsic characteristics and school, grade average of gifted adolescents was found to be 8.89; 59% of them engage in extracurricular activities, generally a sport. In addition, music was the area where most students use their abilities more easily, contrary to dance. Regarding family, 55% of them were found to be firstborns and 46% of mothers and 51% of fathers were found to have a bachelor's degree or a higher level of education.

Also, to learn statistically significant differences, if any, between peers, i.e., gifted male and female participants, a Student's *t*-test was performed, but no differences were found ( $t=p<.05$ ) in relation to either average scores on intellectual capacity, creativity, or academic self-concept nor extrinsic characteristics.

In order to explore how influential the interaction between gender (male, female) and level of education (lower- and upper-secondary school) variables are, a two-way ANOVA test was performed but did not show any differences regarding intellectual capacity ( $F(1, 89) = .529, p > .05$ ), creativity ( $F(1, 89) = .963, p > .05$ ), or academic self-concept ( $F(1, 89) = .556, p > .05$ ). These results were confirmed by analyzing same-size groups.

Additionally, to deepen this profile of adolescents identified as gifted, three groups were formed according to intrinsic characteristics, as described by Armenta (2008), Castelló and Batlle (1998), who explain that characteristics and needs are different depending on the degree and type of ability shown; therefore, grouping was performed as follows: group I was composed of 13 students with a percentile above 75 in all tests (intellectual capacity, creativity, and academic self-concept); group II was composed of 31 students with a percentile above 75 in intellectual capacity and creativity tests; and group III was composed of 49 students with percentile above 75 in intellectual capacity and academic self-concept tests. Thus, each group's intrinsic characteristics and sample percentage can be seen in Table 1.

**Table 1. Gifted adolescents' characteristics by group**

Groups	Gender	Level of education		Total	% of the sample
		Middle school	High school		
Group One: Intellectual capacity, creativity, and academic self-concept	Male	4	5	9	2%
	Female	1	3	4	
	Total	5	8	13	
Group Two: Intellectual capacity, and creativity	Male	5	9	14	5%
	Female	7	10	17	
	Total	12	19	31	
Group Three: Intellectual capacity, and self-concept	Male	11	13	24	7%
	Female	8	17	25	
	Total	19	30	49	
Total	Male	20	27	47	14%
	Female	16	30	46	
	Total	36	57	93	
		5%	9%	14%	

It is interesting to observe that students of group I represent 2% of the gifted population, which is consistent with incidence reported by the World Health Organization (WHO) and Terman (1925). In order to know how intrinsic and extrinsic characteristics correlate by reference group, a Pearson's correlation analysis was conducted for each group, to find that:

Group I showed a negative statistically significant difference between intellectual capacity and creativity ( $r = -.612, p < 0.05$ ). An association between areas and factors was also found. Intellectual capacity level was negatively associated with creativity factors such as fluency ( $r = -.598, p < 0.05$ ), originality ( $r = -.559, p < 0.05$ ), and resistance to closure ( $r = -.678, p < 0.05$ ). This was expected since intellectual capacity is used to process information and find right answers, whereas fluency searches for answers; originality searches for unusual answers which are not necessarily correct; and resistance to closure is about remaining open to new ideas, tolerating ambiguity, and delaying opinion. However, academic self-concept related positively to creativity-related elaboration factor ( $r = .581, p < 0.05$ ); i.e., the higher the ability to deepen and improve an idea, the better the student's academic ability self-concept.

Regarding extrinsic characteristics determined by school environment, the grade average obtained by this group was 9.30, and 77% of students were found to perform extracurricular activities, the areas where they use their abilities the most being mathematics and sports. Regarding family environment, 62% are firstborns, 69% of mothers and fathers have a bachelor's degree, and the remaining 31% finished vocational school or high school.

In group II, a significant positive association between creativity and academic self-concept was noted ( $r = .441, p < 0.05$ ). Likewise, correlations between intellectual capacity and creativity-related factors were observed. Positive associations occurred between intellectual capacity and abstractness of title ( $r = .409, p < 0.05$ ), and intellectual capacity and general intellectual ability ( $r = .468, p < 0.05$ ). Negative associations showed between intellectual capacity and resistance to closure ( $r = -.484, p < 0.01$ ), and intellectual capacity and specific intellectual ability ( $r = -.484, p < 0.01$ ). In addition, academic self-concept correlated with the originality factor of the creativity test ( $r = .367, p < 0.05$ ).

Regarding extrinsic characteristics determined by school environment, the grade average obtained by this group was 8.80, and 58% of students were found to perform extracurricular activities, the areas where they use their abilities the most being sports. Regarding family environment, 48% are firstborns, 39% of mothers and 40% of fathers have a bachelor's degree, and 31% of mothers and 26% of fathers have basic education (primary education and lower-secondary education) only.

In group III there was just one statistically significant association between intellectual capacity level and elaboration from the creativity test ( $r = .412, p < 0.01$ ). The grade average obtained by this group was 8.86, and 55% of students were found to perform extracurricular activities, the area where they use their abilities the most being memory. Regarding family environment, 62% are firstborns, 43% of mothers and 52% of fathers have a bachelor's degree, and 22% of mothers and 16% of fathers have basic education only.

With the purpose of analyzing the difference between groups regarding intrinsic characteristics, a one-way ANOVA test was conducted; the following expected results were observed: a) there was no difference between groups regarding intellectual ability means ( $F(2, 90) = 1.249$ ,  $p > .05$ ); b) but there were differences regarding creativity ( $F(2, 90) = 95.083$ ,  $p < .01$ ), further analyzed with the Scheffé's method, showing that group I ( $M_I = 80.46$ ) and II ( $M_{II} = 80.03$ ) scored higher than group III ( $M_{III} = 49.65$ ); c) regarding academic self-concept ( $F(2, 90) = 143.582$ ,  $p < .01$ ), the Scheffé's method showed that group I ( $M_I = 115.92$ ) and III ( $M_{III} = 115.41$ ) scored higher than group II ( $M_{II} = 86.81$ ). It is important to mention that these differences were expected due to the very nature of this grouping.

As for extrinsic data, statistically significant differences in relation to mothers' level of education were found ( $F(2, 67.19) = 3.371$ ,  $p < .05$ ). Through a Games-Howell test, mothers of students from group I ( $M_I = 4.69$ ) were observed to have a higher level of education than mothers of students from group II ( $M_{II} = 3.77$ ) and III ( $M_{III} = 3.79$ ). Likewise, differences between fathers' level of education ( $F(2, 70.71) = 3.971$ ,  $p < .05$ ) were found. Fathers of students from group I ( $M_I = 4.92$ ) were noted to have a higher level of education than fathers of students from group II ( $M_{II} = 3.78$ ) using a Games-Howell test.

Also, group I had a grade average of 9.30, higher than groups II and III (8.80 and 8.86 respectively). However, differences were not statistically significant ( $F(2, 71) = 1.263$ ,  $p > .05$ ). No differences between groups regarding birth order ( $F(2, 90) = .654$ ,  $p > .05$ ), extracurricular activities ( $F(2, 90) = .244$ ,  $p > .05$ ), or grade average in primary school ( $F(2, 84) = 1.252$ ,  $p > .05$ ) or lower-secondary school ( $F(2, 52.10) = 2.449$ ,  $p > .05$ ) were observed either.

Areas of interest where students use their abilities were also noted to be different depending on groups. For instance, group I claimed to be more skillful in mathematics and sports, group II in sports, and students from group III in memory and social relationships. Conversely, adolescents from group I claimed to be less skillful in drawing, and group II and III in dance.

In order to determine the differences between the three groups regarding the areas where they use their abilities, a one-way ANOVA test was performed, which only showed statistically

significant differences in memory ( $F(2, 88) = 3.087, p < .05$ ). Using the Scheffé's method, students from group I ( $M_I = 5.00$ ) and III ( $M_{III} = 4.60$ ) were found to have a better memory compared to students from group II ( $M_{II} = 6.23$ ). Let us recall that the lower the score, the higher the skill.

Finally, to find whether there existed statistically significant differences between peers (i.e., gifted males and females by group) regarding intrinsic characteristics, a two-way ANOVA was performed. Intellectual capacity did not show any difference, nor did academic self-concept. Nonetheless, interaction between gender and creativity among groups was found to be influential ( $F(2, 87) = 5.130, p < .01$ ). Using the Scheffé's method, differences were observed in group III, where females were found to be more creative than males. Same results were obtained in same-sized groups.

## **Discussion and Conclusion**

The purpose of this study was to establish a profile of gifted students from a public high school belonging to the UNAM. It is fundamental to remark that in Mexico gifted students are not provided with official assistance or follow-up when they received assistance during primary school (Puga, 2004), namely adolescent students. Cortés (2010) emphasizes that implemented policies have been in disarray, with a paltry budget that reveals the absence of a real policy. Thus there are some models that have not yielded the expected tangible results, as in the case of the Assistance for Gifted and Talented Children and Youth Project. Hence, the need for a profile of adolescent gifted students—adolescence being a critical development stage—arises for the purpose of detecting them, promoting their potential, and providing them with an ability-based vocational guidance, as well as an emotional support for their high sensibility and perfectionism.

This identification was based on the Triadic Interdependence model (Mönks & Boxtel, 1985), which observes the importance of both intrinsic and extrinsic characteristics, and the relationships thereof, providing a comprehensive view of the interaction between said characteristics of the gifted participants from our sample, which consists of a population from a public high school with diverse socioeconomic and educational backgrounds. Based on this, results allowed

us, firstly, to establish a general profile and, secondly, to characterize more extensively a differential profile reflecting the general group's diversity.

In the general profile, results show that 14% of the sample matches the gifted profile, indicating a high incidence and a significant population that is not being considered in official statistics and programs. Interesting aspects were observed in this general profile regarding both intrinsic and extrinsic factors. Creativity and academic self-concept intrinsic factors correlated negatively, which means that when students obtained high levels of creativity, in contrast they showed low levels of academic self-concept. This is likely to occur as described by Landau (1997), who explains that people with high creativity rates are not always accepted by teachers, affecting both performance and academic self-concept.

Regarding extrinsic factors for the general profile, most gifted students were found to get high grades as mentioned by López (2003). However, some of them got low grades, with a grade average of 6; therefore, using grade average as the sole criterion for identification is not enough, as in the Gifted Children Program (Programa de Niños Talento) (SECM, 2008), since many low-grade students may be ruled out. Another significant extrinsic characteristic observed in these students was the participation in an extracurricular activity, sports being the favorite. Regarding family environment, 55% of gifted participants were firstborns, which is consistent with the findings by Gross (1993), Silverman and Kearney (1988), López (2003), Terman (1925), Zacatelco and Acle (2009).

In addition, 69% of parents have earned an undergraduate or a graduate degree, which is consistent with the findings by Gross (1993), Gottfried *et al.* (1999), López (2003), Silverman and Kearney (1988), and Terman (1925), who describe that most gifted students' parents attained a high level of education. However, in contrast with the aforementioned, a relevant finding of this study was the high percentage of parents of adolescents identified as gifted who have lower levels of education, an aspect to be further analyzed to determine how parents' expectations and the sense of family unity helped to develop the abilities of these students.

It is important to mention that differences between male and female students were found in relation to identification percentage in the general profile, but no differences between scores of intrinsic or extrinsic characteristics were found; i.e., males and females scored the same in intellectual capacity, creativity, and academic self-concept. Likewise, social context was similar, which differs from findings by Peñas (2008), Robinson and Olszowski-Kubilius (1997), Rodríguez (2002) and Valadez (2004), who observed that during adolescence, females reduce their aspirations and academic achievements. The similarities found between characteristics of males and females are likely due to parents' expectations, since students know that once they enter this particular school, university admission is guaranteed. Thus a research topic could be parents' expectations effect on academic performance of gifted children.

As mentioned before, gifted people are not a population with homogenous characteristics (Mönks, 2008; SEP, 2006; Zacatelco & Acle, 2009; Zavala, 2004), so distinguishing degrees of giftedness is convenient (Armenta, 2008; Castelló & Batlle, 1998), since both characteristics and support needed vary depending on shown abilities and degree. Hence the importance of differentiating identified students based on the levels determined by administered instruments, the analysis of which produced the following three profiles, with interesting characteristics each.

Initially, students from group I showed high intellectual capacity in contrast with low creativity, an interesting relationship since Ferrando *et al.* (2005) and Landau (1987, 2003) state that creativity is not conditioned by a high intelligence level. According to Torrance's threshold hypothesis (1962), when IQ is below a certain threshold, creativity is limited too; however, when IQ is above that threshold (IQ=115-120), creativity becomes an almost independent dimension. Zavala (2004) in turn suggests that the threshold hypothesis provides an opportunity to consider that intelligent subjects lack high creative characteristics. Moreover, Simonton (1994) and Sternberg (1996) suggest that very high IQs may hinder creativity.

As for school environment, although the three groups got a grade average above 8.80, group I scored the highest, confirming that most gifted students get high grades at school (López, 2003). Furthermore, Moriana *et al.* (2006) found that students perform better when involved in extracurricular activities. According to this, the proportion of students from group I with extra-

curricular activities was 20% higher than that of the other two groups. Keeping in mind that parents of students from group I showed the highest levels of education compared to parents of students from the other groups, this proportion is consistent with the findings by López (2003), who suggest that parents with a higher level of education engage their children in multiple cultural and sports activities.

Group II showed high intellectual capacity and creativity, but showed low academic self-concept, which affects their academic performance. Although there were no statistically significant differences, this group was noted to get the lowest grade average, likely due to self-concept influencing students' academic achievements and expectations (Amezcuca & Fernández, 2000; Broc, 2000; Henson & Heller, 2000; Möller & Pohlman, 2010; Musitu, García & Gutiérrez, 2002), as well as the development of cognitive strategies and self-regulation for school learning (González-Pineda *et al.*, 1997; Monereo, Castello, Clariana, Palma & Pérez, 1994). Another possible explanation for this is the parents' low levels of education, which prevent them from giving enough educational support (Gómez & Valadez; 2010; López, 2003; Renzulli & Park, 2000). Additionally, it is important to note that gifted students with low academic self-concept and whose parents have a low level of education are at risk of school failure (López, 2003; Acle & Ordaz, 2010); therefore, they require additional academic and emotional support.

Students from group III showed high intellectual capacity and high academic self-concept. And in spite of being the group with the lowest score on creativity, there were no differences with the other two groups regarding drawing elaboration; i.e., these students showed the same ability to detail, deepen, improve and develop their ideas. However, it is interesting to note that only this group showed differences regarding gender. Females scored a higher creativity rate, leading to the conclusion that these results particularly disagree with the findings by Coriat (1990), Landau (2003), Peñas (2008), Robinson and Olszowski-Kubilius (1997), Rodríguez (2002) and Valadez (2004)—who found that female gifted adolescents only develop partly their potential and reduce their aspirations because they fear social isolation and rejection—and thus are consistent with Freeman (2004), who found that gender-based differences does not necessarily occur in every culture.

So these findings highlight that gifted adolescents are a heterogeneous population that in spite of sharing some intrinsic and extrinsic characteristics, differ in others such as giftedness degree (Armenta, 2008; Castelló & Batlle, 1998), an aspect to be taken into consideration when designing educational programs to meet both their internal and external needs so that they can succeed in higher education.

Finally, regarding the limitations of this study, it is essential to remark that the design of this study only allowed us to identify context characteristics stated by gifted participants; however, actors involved in their social context, i.e., family and school, must be studied in depth as well. Not only are family characteristics known to constitute a key element on gifted students' development, but also parents' perception, expectations, and academic involvement are determining factors. Moreover, in the school context only academic performance was included; however, there are two more actors affecting students: teachers and friends. It is crucial to know teachers' input on this issue, as well as their view and expectations, since they can help to guide and encourage students as the latter grow intellectually, or not. Friends and classmates are the other extremely important actor, since they influence the behavior of the gifted given the latter's need to belong. In addition, due to the specifically local sample used, it is necessary to repeat these experiments in other upper-secondary schools.

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