

Development and Validating a Behavioural Characteristics Rating Scale of Kindergarten Gifted Children in Saudi Arabia

Abdullah M. Aljughaiman

King Faisal University, Saudi Arabia

Usama M. A. Ibrahim

Sohag University, Egypt

This study aimed at developing a scale of behavioral characteristics of kindergarten-gifted children to be used in nominating children for gifted programs in Saudi Arabia. To achieve this goal, a blueprint of the scale was developed based on pertinent literature of the behavioral characteristics of gifted children. The blueprint of the scale was submitted to a jury of specialists in the field of gifted education to decide on its appropriateness and applicability in the Saudi context. Then, the scale was applied by 50 kindergarten female teachers who have evaluated 539 male and female kindergarten children in the neighborhoods of Riyadh, Jeddah and the Eastern Provenance in Saudi Arabia. Reliability of the scale was calculated using the split-half (.83) and Cronbach's α (.84). A factor analysis yielded five dimensions of behavioral characteristics including: motivation and the desire to learn, language characteristics, learning characteristics, personality characteristics, and logical/math thinking characteristics. Results indicated that there were differences between males and females in the dimensions of motivation and language characteristics favoring females, and in the dimension of the logical/mathematical thinking favoring males. There also were differences between three stages of age for the advantage of the older ages. In addition, there were significant differences between gifted and non-gifted children in all dimensions. Generally, results of the study indicated that the scale is valid for use in identifying Saudi's kindergarten-gifted children.

Introduction

The use of teacher nominations to identify and select students to be admitted to gifted programs is an age-old practice (Hunsaker, Finley, & Frank, 1997). Teacher nomination is one of the most widely used means of identifying gifted children (McBride, 1992). The popularity of this method for identifying the gifted is attributed to the fact that the gifted children possess a set of

cognitive, motivational and personal characteristics that may not be measured by intelligence or achievement tests (Gross, 1999; Renzulli, 2005). Since teachers are closely attached to the students during their years of study, they are able to recognize children who show high aptitudes at different age levels.

Although literature has demonstrated the effectiveness of using teacher nominations in identifying gifted children, this method came under scrutiny by many researchers (e.g. Hadaway & Marek-Schroer, 1992; Neber, 2004). In a meta-analysis of studies about the accuracy of teacher nomination of gifted children, Gear (1976) reported accuracy rates

Address correspondence to Abdullah M. Aljughaiman, King Faisal University, The Research Center for Giftedness and Creativity, Alhassa 31982, Saudi Arabia. E-mail: alju9390@yahoo.com

between 4.4 % and 48%. Some of the reasons for this low accuracy rate are that teachers are not well trained and have not enough knowledge of the characteristics of gifted children (McBirde, 1992). Gross (1999) has found that kindergarten female teachers who did not receive any training in gifted education tended to exaggerate the abilities of children who show co-operation in the class and seek teachers' satisfaction.

Borland (1978) maintained that improved accuracy of teacher nominations was possible and depended on ratings based on specific characteristics of gifted students rather than on global judgments of giftedness by teachers. Hany (1993, 1997), after reviewing recent research, also concluded that teachers were able to make adequate classification decisions regarding students, and that their judgment of whether gifted or not, though biased by the heuristics of representation, confirmation and base rate, could nevertheless be modeled using a cue utilization approach.

Researchers have confirmed that in-service training for gifted education and the provision of scales that include the characteristics, which distinguish gifted children, help in increasing the teacher's competency through raising their awareness about giftedness (Hill, 1992; Pardeck, et al., 1990; Silverman, Chitwood, & Waters, 1986). Therefore, researchers' concerns have been directed towards developing rating scales that include the most important behavioral characteristics that distinguish gifted students to be used by teachers to improve the accuracy of identifying gifted children. These scales have become the most commonly used tools in the process of nominating children for gifted programs (Davis & Rimm, 2004; Feldhusen, Hoover, & Sayler 1990; Ma'jeeeni, 1997; Gagné, 1999; Renzulli, Smith, White, Callahan, Hartman, & Westberg, 1997; Silverman, 1997-2004).

With the increasing number of enrichment programs developed for gifted

and talented students in Saudi Arabia, the identification and selection of students who could potentially benefit from these provisions have become a major concern. In Saudi Arabia, gifted children are usually identified as those who are able to demonstrate high ability in one or more areas deemed necessary by the society. The most used ways of identifying gifted individuals are intelligence tests, creativity tests, and task commitment. Task commitment is measured in academic achievement. The multiple criteria identification procedure adopted by Saudi Arabia and other Arab countries is based on a number of principles similar to those advocated by (Subhi & Maoz, 2000: 746) including:

1. gifted and talented children should be identified as early as possible in their educational careers;
2. the focus of identification is not to label students but to recognize and respond to gifted and talented students' educational needs;
3. the identification of gifted and talented students require the utilization of formal and informal measures obtained from many resources in a wide variety of settings; and
4. identification instruments and procedures must match with the programs provided to gifted and talented children.

As there were no educational institutions specifically responsible for the identification and education of gifted individuals, the Saudi Ministry of Education established King Abdulaziz and his Companions Foundation for Giftedness and Creativity (MAWHIBA) in August, 1999. MAWHIBA is a non-profit organization officially established with a Royal decree. The main purpose of MAWHIBA is to serve as a reference authority in identifying Saudi gifted individuals and contributing to the fulfilment of their potentials and the development of their abilities, skills, and

attitudes. Fulfilling their personal goals, in turn, would contribute to the comprehensive development of the Saudi society.

Recently, MAWHIBA has started enrichment programs for nurturing giftedness along various stages of schooling beginning with the elementary stage. Lately, MAWHIBA planned for extending these programs to include kindergarten children. One of the main obstacles for such expansion was the unavailability of instruments suitable for the identification of gifted children at this early stage. The measures currently used by the Ministry of Education to identify gifted students include the Intellectual Abilities Test and the Arabic version of Wechsler's Test. The former is suitable for individuals beyond the elementary stage. Wechsler's Test, on the other hand, is an individual test that is difficult to apply on a mass scale. Hence, a need was felt for an instrument suitable for the initial screening of gifted children at this age of development.

It becomes increasingly recognized that teachers can be able to provide valuable information on the giftedness of children in conjunction with standardized measures. Therefore, validity and reliability of teacher nomination can be improved when teachers are provided with objective behavioural scales to guide their nominations in identification process. Consequently, serious attempts have been made by Arabian researchers to adapt scales to be used in the field of identifying the gifted in Saudi Arabia (e. g. Alfheid, 1993; Alnafi et al., 2000; Aldmiati, 2004). Yet, all these attempts focused on the stages of primary, intermediate and secondary stages and did not touch upon kindergarten. This might be attributed to the practical perspective of those researchers, since there were no programs concerned with this age group in Saudi Arabia and most of the Arab countries. Accordingly, it has been necessary to develop a valid scale of the behavioral

characteristics of the pre-school children that can be used by kindergarten female teachers in the process of the initial screening of the gifted children, to whom special educational services will be presented in Saudi Arabia. The current study came as a trial to meet this need through constructing and validating a scale for defining the behavioral characteristics of gifted children at the kindergarten stage.

The age group from 3 - 6 years old has been chosen as a target group for this study for many reasons; the pivotal role of the child in the first five years and its profound impacts on mental development and the readiness for learning, the identification of the child giftedness during this stage helps in building up and preparing the special educational programs for this age group in a way that suits their abilities. By using the behavioral scales, the process of identifying the gifted will contribute to the enlightenment of parents and teachers about the distinguishing behavioral characteristics and properties of gifted children. In addition, there is no scale of behavioral characteristics to identify gifted children in this age group in the Saudi Arabian environment.

Significance of the current study stems, firstly, from its peculiarity to build up a scale that contributes to the early identification of the gifted children and at the same time considers the cultural and environmental features of the Saudi context. Secondly, there is a felt need in the Saudi society for feasible and flexible tools that enable teachers and parents to identify the characteristics of the gifted students at an early age. In addition, designing a feasible scale of the behavioral characteristics of gifted children may be instrumental in activating the role of the educational institutions, especially the schools and kindergarten in the process of identifying the gifted and utilizing the services presented to them.

Specifically, this study aimed to: (1) develop a scale of behavioral characteristics for the gifted children at the

kindergarten stage; (2) ensure reliability and validity of the scale; (3) define differences between the means of teachers' ratings for both males and females on the different dimensions of the scale; (4) define differences between the means of teachers' ratings for the three age groups on the different dimensions of the scale; and (5) define differences between the means of teachers' ratings for gifted and non-gifted on the different dimensions of the scale.

Review of Literature

As Davis and Rimm (1998) observe, "Defining gifted and talented is both an important and complicated matter" (p. 17). The researchers' definitions of giftedness vary. The concentration of the researchers also varies from the individuals' potential capacities to the actual performance, and from the general intellectual ability, to the special abilities in specific domains (see Sternberg & Davidson, 2005; Winner, 2000; Winner & Martino, 2000).

The term "gifted" is usually used to refer to both the gifted child and the gifted adult, but some researchers have tried to present a clearer distinction between them. The gifted child is the one who is able to think in a better way and learns more quickly. On the other hand, the adult is not considered gifted unless he/she proves his/her giftedness through innovative and creative products. Various environmental, social and emotional factors influence the process of developing giftedness (Gagné, 2000; Feldman, 1986; 1991; Monks & Mason, 2000; Tannenbaum, 1997).

Researchers point out that some of the gifted children's behaviors interfere much often with identifying their abilities because these behaviors sometimes are varied and unstable (e.g. Ma'jeeni, 1997; Silverman, 1997-2004; Walberg, 1995). The challenge becomes more complicated when speaking about identifying giftedness and high abilities of children at the kindergarten stage. This is because the available scientific tools for identification

of the gifted in this age group are few (Pardeck, et al., 1990). Although teacher nomination constitutes one of the most common methods for identifying gifted children, it is also the most controversial one regarding its accuracy. Many teachers are concerned with the outer appearance and the surface characteristics (Alnafi et al., 2000).

The main drawback in using the nomination procedure lies in the teacher's ability to observe the gifted behavior objectively (Slabbert, 1994; Smutny, 2000; Torrance & Safter, 1986). This led many researchers to try to increase the reliability of this process by building up scales of behavioral characteristics for the gifted, which became a common tool for nominating students to gifted programs. It is used as an important means for observing the gifted behavior and increasing teachers' awareness of the signs of giftedness (Silverman, 1997-2004). The National Association for Gifted Children highlights that the process of identification of the gifted should include the search for signs of the giftedness, and helping teachers to recognize the behavioral characteristics that are of perennial link with high intellectual readiness (National Research Council, 2002).

Chan (2000) explored the use of teacher and parent ratings in identifying Chinese gifted students, using Chinese version of the Scales for Ratings the Behavioral Characteristics of Superior Students. Results showed a greater relevance for measuring leadership and motivation characteristics, and less relevance on creativity characteristics.

Smutny (2000) has referred to the use of continuous observation as one of the best-recommended ways for identifying gifted children at an early age. Wiman and Sandhu (2004) point out that one of the best methods for identifying gifted children, especially at early ages, is through observing children's behavior and not through formal intelligence tests, which require knowledge of reading and

writing for the understanding of the questions. Silverman (1997-2004) assures that, from a developmental point of view, the characteristics that are linked to giftedness appear at an early age and many of the behavioral scales were used successfully in predicting and recognizing the gifted at this period.

Literature indicates that gifted children have characteristics and abilities that distinguish them from their peers. Liu (1999) mentions that gifted children possess characteristics that distinguish them from average children, especially in the field of advanced mathematical and linguistic abilities, and Liu's study also reveals that these characteristics can be observed at an early age. Chen's study (Chen et al, 2004) has revealed that gifted children at the pre-school stage show a number of educational characteristics such as the multiplicity of interests, concentration on the task and the desire to experience different types of tasks.

The longitudinal study of Worthington (2001) for studying the teachers' and parents' awareness of their children's learning of reading and writing at the pre-school stage up to the second primary grade- has revealed that parents represent an important source of information about their children's skills, their learning behaviors and their intelligence. This result refutes the common belief that parents exaggerate the estimation of their children's skills. Alnafi and others' study (2000) in the Kingdom of Saudi Arabia found out that teachers showed high degrees of accuracy in recognizing gifted children when they were provided with characteristics checklist.

Characteristics of Gifted Children

The differences between gifted children and their peers clearly appear from the first years. Literature shows that gifted children reveal clear differences in development when compared with their normal peers. The early development of speech, movement and reading is

considered remarkable signs of intellectual giftedness. When these characteristics appear together at an early age they reflect a great development in the intellectual ability (Jackson, 1992). Staines and Mitchell (1982) have noticed that most of the children vocalize their first words at the age of twelve months (while gifted children start to vocalize at the age of ten months. At the age of eighteen months, the normal child acquires about 3 to 50 words and shows attempts to connect these words together to form parts of sentences. On the other hand, gifted children start connecting words and forming sentences at the age of eleven months. They also acquire a larger vocabulary, which helps them to form sentences that are more complicated. These differences increase noticeably at the age of four and half. The higher the level of giftedness, the more these differences increase and become easily noticed.

This development of speech in the case of the highly gifted child may concur with a noticeable development of movement and walking at a relatively early age in comparison with normal children. Reading at an early age is considered one of the strong signs of intellectual giftedness (Gross, 1993). Rogers and Silverman (1997) studied the behavioral characteristics of (241) highly gifted children (IQ = 160+). Results of the study indicated that at the early years of childhood, 94% of these children showed higher degrees of attention, 94 % showed higher degrees of concentration, 91% showed higher degree of linguistic development, 60% showed higher kinesthetic development, 48,9% showed prominent distinctions compared with their peers in their development, 37% exhibited more imaginative expression. On the average, highly gifted children vocalized their first words at the ninth month and were able to read well before they reached their fourth year.

These results concur with the findings of Gross' study (1993) on a number of gifted children who have a high mental

ability. The findings show that they were enjoying high linguistic ability, rich vocabulary, a longer attention span, a high ability for equivoque, a high ability to grasp the causative relations and the ability to read at an early age. Moreover, Smutny (1998) has noticed a set of behavioral characteristics, which are exhibited by gifted children at the fourth, fifth, and sixth years of age in response to educational activities at home or at the kindergarten. These characteristics include: the desire and curiosity to know many things, asking questions that require deep thinking, having a rich and advanced language vocabulary, using complicated phrases correctly, expressing their thoughts and emotions well, solving riddles and complicated problems, having good memory, showing a high ability of imaginative expression, using previous learning experiences in new situations, exhibiting high ability to organize things logically, discussing ideas thoroughly, learning quickly and easily, taking initiatives, showing keen powers of observation, making up good stories, and love for reading.

These characteristics generally concur with the results of Rogers' study (1986) who conducted a comparison between gifted children and children with average intelligence. The study revealed that more than 56% of gifted children managed to know the characters when they reached two years, 31% managed to know the words when they reached the age of two years, 50% managed to read well when they reached the age of four years, 81% dealt with the games of "piecing together" in a good way when they reached the age of three years, 61% managed to deal with time and to tell the time exactly at the age of five and 2% managed to count from 1 to 10 before they reach the age of three years.

Bryant (1989) studied the characteristics of the gifted children who started reading in an early age. The findings show that they seem to be very keen to learn and to work independently.

They have a good memory, a high ability for concentration, a rich vocabulary, high abilities for thinking and a high ability to generate ideas. Davis & Rimm (1998) point out that gifted children are able to count the diploids of five and ten, and to use the processes of summation and subtraction for two figures before reaching the age of six years.

The Scales of Behavioural Characteristics

In spite of the criticism of the accuracy of the teacher nomination, this method has continued to be followed as one of the important and practical procedure that is used in different countries in the initial processes of sorting out the gifted. Renzulli (1997) Scales for Rating the Behavioral Characteristics of Superior Students (SRBCSS) which was developed by Renzulli (Renzulli et al, 1997). It is used in the stages from elementary to secondary, and consists of fourteen subscales to help identify student strengths in the following areas: Learning, motivation, creativity, leadership, art, music, dramatics, planning, communication, mathematics, reading, science, and technology. Feldhusen and others (1990) have developed Purdue Academic Rating Scale that is used at secondary stage. Rimm has developed the Achievement Identification Measure (AIM). This tool is used by parents and includes the dimensions of motivation and academic readiness (Davis & Rimm, 1998). Gagné (1999) has also published rating scales to identify multiple talents through ratings by peers teachers, and self-assessment for cognitive abilities academic talents, social skills, physical-sport abilities, and technological and artistic talent. Smutney (2000) has developed a scale that she named "Checklist of My Child Traits." It consists of 46 characteristics which is applied by parents to determine whether the characteristics exist or not. Silverman (1997-2004) has developed a scale "Characteristics of

Giftedness Scale" that consists of 25 characteristics and used by parents.

In Arab countries, several rating scales have developed and/or translated into Arabic language to be used at primary, intermediate and secondary stages. In Jordan, Alrosan and Alsoror (1998) have developed a modified Jordanian version from *Gift Scale* for identifying the gifted children at the primary stage. The results of the study revealed that this scale enjoys an acceptable degree of reliability and validity. In addition, Alrosan and others (1990, cited in Alrosan, 2006) have developed an adapted Jordanian version from *Pride Scale* for identifying gifted children at the pre-school stage. The factorial analysis of a sample consisting of 194 children from both sexes revealed the existence of 5 main factors. These factors are the diversity of interests, constructive playing and social acceptance, imaginative thinking, independent thinking and originality in thinking. Yet, the reliability of the scale using the internal coefficient of homogeneity of the scale was below average (.48) (Alrosan 2006). In the Saudi environment, Aldimati (2004) has developed an arabized version from the *Gifted Classification Scale* which was developed by Johnson (Johnson, 1980). This scale consists of five fields. These fields are academic distinction, general mental ability, creative thinking, leadership, visual and performing arts, sport games and psychomotor ability.

It appears from the literature that there is a set of characteristics that distinguish gifted children. These characteristics can be trusted in discovering the gifted at the different levels of age, if they are put in a form of special scales. Teachers can use these scales after explaining their items and training them in how to use and conduct them. To the researchers' knowledge, there are no Arabic behavioral scales for the age period from 3 - 6 years. Accordingly, the current study depends on the worldwide-published literature in choosing the items that are included in this

form to be used by teachers in nominating the kindergarten-gifted children.

Method

Participants

The participants of the study included 539 kindergarten children from Riyadh, Jeddah and the eastern provenance neighborhoods. Sixty children from this sample were nominated by the head teachers as gifted children according to their portfolios. The whole sample included 253 males and 286 females. Their ages ranged from 3 to 6 years. Fifty female teachers took part in the evaluation of the children provided that each has known the child she evaluated for a period no less than one school year. Participants who did not complete answering the scale were excluded in the analysis of the results. Table (1) shows the sample distributed according to sex and age.

Procedure

Researchers have reviewed the literature in the field of the behavioral characteristics of gifted children. They also reviewed a number of scales that have been developed in Arab and other environments. On the light of this, the blueprint of the scale of behavioral characteristics for gifted children from 3-6 years of age has been formed. The blueprint of the scale included (60) items pivoted around three dimensions. These dimensions are cognitive characteristics, personality characteristics and motivational characteristics. The scale was shown to a jury of eighteen experts in the field of gifted education. Then, the researchers modified and/or deleted some items of scales in the light of the jury members' recommendations.

The researchers have conducted a pilot study to examine the clarity of the scale, and the appropriateness of its items and instructions. The pilot study aimed at knowing about the clarity of the measurements of estimation and how it is

to be used and how to deal with the scale regarding the formalities. The scale has been sent to the directors of kindergarten in Riyadh, Jeddah and the eastern provenance to hand it over to the kindergarten female teachers, after providing them with a thorough explanation about the mechanism of applying it. Then, the scale was applied to 49 children in the three neighborhoods. A set of observations about the application process displayed by the teachers were documented besides the observations, which have been documented through the procedures that accompanied the application process. These observations represented in the difficulty of dealing with the items that need the mothers' cooperation to be answered such as (revealed an interest in time; managed to distinguish characters at an early age; counting numbers from 1 to 10 at an early age). These items need the cooperation of family and this made the estimations of these items an obstacle to the usage of the scale. In order to make the teachers the only authority on the estimation of all the characteristics of the scale, these items have been reconsidered and subjected to modification or deletion.

In respect to scale items ability to distinguish between children at different cognitive levels, the (Chi^2) equation was used to calculate the differences between children's scores at the upper lower quartiles for each item. To do this, the children's scores on the scale were arranged in a descending order. Then, mean differences between scores in the upper and lower quartiles were calculated. Selected items included those with the largest mean differences between children's scores in the two quartiles. These mean differences were statistically significant ($p < .001$).

In light of what was mentioned the scale was revised to include 43 items, and then sent again to the directors of kindergarten in Riyadh, Jeddah and the eastern provenance who handed it over to

the kindergarten female teachers in these neighborhoods and explained the objectives of the scale and how to apply it. Fifty female teachers from 20 kindergartens took part in the application of the scale. Each teacher has evaluated from 10–15 male and female children from high abilities children with the condition that she had dealt with those children for a period no less than a school year. In addition, the head teachers of these kindergartens were asked to nominate the best three kindergarten children whose belief that they are gifted in light of their portfolios, and then rate them on the behavioral characteristics scale. Then the scales have been cleared out and analyzed by SPSS.

Results

Validity of the Scale

The scale has been sent to a jury of 18 specialists in the field of gifted education, to judge the appropriateness of each item regarding its statement, belongingness to the field and the appropriateness of the fields for evaluating the peculiar characteristics of gifted children. The researchers have rewritten the scale in the light of the judges' recommendations. Thereby, the final version of the scale included 43 items.

Factorial Structure

A factor analysis was conducted on the scores of 539 male and female children. The principal component factoring with Varimax rotation yielded five dimensions of behavioral characteristics of gifted children. These dimensions are motivation and the desire to learn, the linguistic characteristics, learning characteristics, personality characteristics and logical/math thinking. Eigen values were 12.76, 2.12, 2.02, 1.79 and 1.59 consecutively. These factors explained 47.36 % of the total variance in scores. The five dimensions came specific with high factorial loadings as shown in Table 1.

Table 1
Summary of Varimax Rotated Five-factor Solution of the Scale Items

<i>Item</i>	Factors/Dimensions				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Is persistent (10)	.668				
Likes collecting things (9)	.618				
Has many interests (7)	.574				
Engages in self-directed activities (16)	.571				
Intense involvement in work (12)	.532				
Inquisitive (11)	.529				
Enjoys learning (15)	.500				
Likes reading (17)	.499				
Has a strong desire of discovery (8)	.491				
Enjoys new things (14)	.430				
Requires little direction (20)	.400				
Has an enriched vocabulary (2)		.777			
Uses vocabularies accurately (1)		.770			
Uses complex sentences (3)		.761			
Has an ability to elaborate by using complete Thoughts(4)		.738			
Explaining ideas clearly (18)		.548			
Began reading at an early age (19)		.476			
Sees connections between unconnected things (5)		.473			
Raises different questions (26)			.694		
Unusual ideas (25)			.665		
Keenly observant (23)			.655		
Possesses an outstanding memory (27)			.647		
Learns skills rapidly and efficiently (21)			.585		
Spontaneous (22)			.565		
Strong tendency for inquiry (28)			.515		
Has long attention span (41)			.495		
Is able to grasp complex ideas (29)			.474		
Has multiple skills (33)				.741	
Is independent thinker (37)				.683	
Extremely active (40)				.628	
Has a high energy level (43)				.531	
Has leadership skills (34)				.520	
Keen sense of humor (6)				.511	
Is imaginative (35)				.419	
Outspoken (36)				.410	
Prefer playing with older children (42)				.407	
Possesses good physical skills (38)				.401	
Sensitive to critics (39)				.400	
Deals with numbers easily and accurately (31)					.760
Has a high ability to understand numeric concept (30)					.706
Has advanced logical thinking skills (32)					.719
Has an ability to conceptualize and synthesize (13)					.575
Is able to understand abstractions (25)					.417
Eigen Value	12.765	2.120	2.016	1.798	1.586
Percentage of Variance	29.66	5.14	4.69	4.18	3.69
Total Percentage					47.363

Note. Only salient loadings of 0.40 or above are shown. The number in parentheses following each item indicated the item numbers in the scale.

Reliability of the Scale

The reliability of the scale has been calculated through split-half coefficient for the scale items by using Spearman–Brown formula. This yielded a reliability coefficient of .83. Also, the reliability of the scale as a whole was calculated by using Cronbach's α which yielded a coefficient of .84. These values are high, statistically accepted and indicate that the scale enjoys a high degree of reliability.

In addition, the reliability coefficient for each of the five dimensions was

calculated by using Cronbach's α . The reliability coefficients were as follows: Motivation and the desire for learning .86, characteristics of linguistics .88, characteristics of learning .80, personality characteristics .81 and logical/math thinking .66. All these values are high and statistically accepted even though the correlation coefficient of the logical/math thinking is the least, because its items are few (5 items). Moreover, the children's scores on scale dimensions were correlated with their total scores on the scale as shown in Table 2:

Table 2

The Correction Coefficients Between the Five Dimensions and the Total Score of the Scale

	Motivation	Characteristics of linguistic	characteristics of learning	Personal characteristics	Logical math/ thinking
Motivation	-				
Characteristics of linguistic	.678	-			
Characteristics of Learning	.706	.624	-		
Personality characteristics	.607	.615	.615	-	
Logical/Math thinking	.533	.485	.385	.323	-
Total score	.868	.799	.810	.828	.672

It is clear from Table 2 that all the dimensions are highly correlated with the total score and the correlation coefficients have ranged from .67 - .87. These coefficients are accepted and statistically significant. This also points to the consistency of the dimensions that the scale includes. The correlation coefficients between the five dimensions were high, but the correlation coefficients between the mathematical thinking, the linguistic characteristic and the personal traits were

low even though they were statistically significant.

Differences between Males and Females in the Scale Dimensions

To examine differences between means of teachers' ratings for both males and females on the scale of the behavioral characteristics of gifted children, t-test formula was run to children's scores on the five dimensions of the scale. Results are shown in Table 3.

Table 3
T-test Results of the Differences Between Males and Females on the Scale Dimensions

		N.	M	SD	t-value	Sig.
Total score	Males	253	182.53	27.03	1.97	.161
	Females	286	185.54	23.14		
Motivation and desire for learning	Males	253	50.23	8.43	4.46	.035
	Females	286	51.65	7.22		
Characteristics of linguistics	Males	253	28.76	5.12	6.63	.010
	Females	286	30.15	4.35		
Characteristics of learning personality characteristics	Males	253	35.45	5.12	1.67	.196
	Females	286	36.39	4.35		
Logical/math thinking	Males	253	46.15	8.02	0.20	.652
	Females	286	45.52	7.44		
	Males	253	22.09	6.44	3.98	.047
	Females	286	21.82	5.52		

Table 3 shows that there are no statistically significant differences between mean scores of males and females on the scale as a whole, characteristics of learning dimension and personality traits dimension. On the other hand, the results show that there are statistically significant differences in the dimensions of motivation and the desire to learn and the characteristics of linguistics favoring females ($p < .025$ and $.01$) respectively. While there are significant differences favoring males in the dimension of mathematical thinking ($p < .047$). These results are in line with research results well-established in literature. This points out to the validity of the scale to diagnose characteristics of gifted children. This also documents success of female teachers in

accurately deciding upon distinguishing characteristics of kindergarten gifted children, which in turn reflect validity of the scale in the initial screening of those children.

Differences Between Age Groups

To examine the differences between children's mean scores at the three different age groups (3-4, 4-5, 5-6 years old) on the scale as a whole as well as on its individual dimensions, a series of analyses of variance were run on children's scores on the scale and its five dimensions. Table (4) shows the results of the analysis of variance for testing the significance of the differences between children's mean scores at the three age groups.

Table 4
ANOVA Results for the Differences Between the Three Age Groups

Dimensions	Source of variance	SS	DF	MS	F	P
Total score	Between groups	14226.53	2	7113.26	13.069	.001
	within groups	291141.93	536	543.17		
	Totals	305368.46	538			
Motivation	Between groups	1260.378	2	630.20	14.558	.001
	Within groups	23202.47	536	43.29		
	Totals	24462.85	538			
characteristics of linguistics	Between groups	234.35	2	117.18	4.789	.009
	Within groups	13115.29	536	24.469		
	Totals	13349.64	538			
characteristics of learning	Between groups	529.588	2	264.79	13.996	.001
	Within groups	10140.82	536	18.92		
	Totals	10670.41	538			
personality characteristics	Between groups	859.279	2	429.64	9.605	.001
	Within groups	239575.12	536	44.73		
	Totals	24834.40	538			
Logical/math thinking	Between groups	186.45	2	93.23	6.068	.002
	Within groups	8235.20	536	15.36		
	Totals	8421.64	538			

It is clear from Table 4 that there are statistically significant differences between the three age groups in the total score of the scale ($F[2,538]= 13,069$; $p < .001$). Also there are statistically significant differences between the age groups in the scale dimensions of motivation and the desire to learn ($F[2,538]= 14,55$; $p < .009$), linguistic characteristics ($F[2,538]= 4,789$; $p < .001$), characteristics of learning ($F[2,538]= 13,996$; $P < .001$), personality traits ($F[2,538]= 9,605$; df ; $p < .001$), and the logical/math thinking ($F[2,538]= 6,068$; $p < .002$).

To examine the source of these differences between age groups, the Scheffé Test was conducted on the total score of the scale as well as its 5 dimensions. Results of Scheffé Test revealed that there were significant differences between the three age groups favoring older children at $p < .01$. These

differences were more evident in the older age group (5-6 years) compared to the younger one (3-4 years). This means that motivation, linguistic characteristics, learning characteristics, personality characteristics and logical/math thinking improve with the advancement of children's age. This result reflects natural development along these stages of age. This also presents evidence about the validity of the scale for identifying gifted children at this age level.

Differences Between Gifted and Non-gifted in the Scale Dimensions

The differences between means of teachers' ratings for both gifted and non-gifted children on the scale of the behavioral characteristics of gifted children, t-test formula was run to children's scores on the five dimensions of the scale. Results are shown in Table 5.

Table 5
T-test Results of the Analysis of Differences Between Gifted and Non-gifted Children on the Scale Dimensions

Dimensions		N.	M	SD	t-value	Sig.
Motivation and desire for learning	gifted	60	48.4	1.69	9.05	.001
	normal	479	41.9	5.5		
Characteristics of linguistics	gifted	60	34.8	0.50	12.69	.001
	normal	479	27.2	4.6		
Characteristics of learning	gifted	60	44.4	1.02	8.6	.001
	normal	479	38.5	5.25		
personality characteristics	gifted	60	52.3	2.54	10.81	.001
	normal	479	43.3	6.43		
Logical/math thinking	gifted	60	24.5	0.96	9.19	.001
	normal	479	20.5	3.30		

Table 5 shows that there are statistically significant differences between mean scores of gifted and non-gifted children on the all dimensions of the scale favoring gifted children ($p < .001$). This documents success of female teachers in accurately deciding upon distinguishing characteristics of kindergarten-gifted children, which in turn reflect validity of the scale in the initial screening of those children.

Discussion

The current study aimed at developing a scale for identifying the behavioral characteristics of gifted children from 3 – 6 years of age in the Saudi environment, to be used by female kindergarten teachers in the process of nominating children for gifted programs.

Factor analysis has been used to examine the factorial structure of the scale. As shown in Table 1, the characteristics of gifted students, as perceived by their teachers, fell nicely into 5 domains of behavioral characteristics; namely, motivation and the desire for learning, linguistic characteristics, learning characteristics, personality characteristic

and logical/mathematical thinking. The Eigen values for these factors were 12.76, 2.12, 2.02, 1.79, and 1.586 respectively, which explained 47.36% of the total variance in scores.

It is notable that the logical/mathematical thinking dimension delineated in the current study has not been extracted in similar research such as that of Alrosan's study (2006). The delineation of this factor can be attributed to two main reasons. On the one hand, there were differences in the age groups between the current study and that of Alrosan (2006), which in turn may have resulted in differences in behavioral characteristics. Second, cultural differences may have also contributed to differences in the behavioral characteristics.

The reliability of the scale as a whole was calculated by the split-half technique. The value of the coefficient came up to .84. In addition, the reliability of the scale was calculated using Cronbach's α and the coefficient was .84. This indicates that the scale has an acceptable degree of reliability. Moreover, reliability of the scale dimensions were calculated yielding

coefficients ranging from .66 to .87 indicating an acceptable degree of reliability. The coefficient for the dimension of the logical /math thinking was the least. This may be attributed to the relatively small number of items in this dimension. Reliability of this dimension may be increased including additional items.

The internal consistency of the scale was calculated through correlating scores on the five dimensions and the total score resulting in values ranging from .67 to .87 which are statistically significant. In addition, the correlative relations between the five dimensions were high and accepted even though the correlation coefficient between the mathematical thinking and the personality traits was relatively low .32. This may denote that no logical relationship exists between personality characteristics of children and their mathematical thinking.

The differences between the mean score of males and females on the scale as a whole, and on each of the five dimensions were calculated. Statistically significant differences were found between males and females in the two dimensions of motivation and linguistic characteristics favoring female children. However, statistically significant differences between males and females were found in the mathematical thinking dimension favoring male children. No statistically significant differences were found between males and females in the scale dimensions of personality characteristics and the learning characteristics. These results conform to those cited in literature of gender differences showing female supremacy in linguistic abilities and male supremacy in mathematics. This in turn confirms the validity of the scale and the ability of the female teachers to evaluate the children well.

Also, this study calculated the differences between the three age groups using the one-way analysis of variance (ANOVA), and the results revealed the

existence of statistically significant differences between the mean scores of children at the three age levels ($p < .001$) favoring older ages (5-6) in comparison with the younger (3-4). This indicates that the motivation and linguistic characteristics, characteristics of learning, personality characteristics, and mathematical thinking for the children develop with age. This presents another evidence for the validity of the scale in the process of identifying gifted children at this stage.

Generally, the present findings supported the initial conviction that the provision of a behavioral characteristics scale of giftedness to teachers can aid teachers to make explicit their perception of giftedness in students that they nominated for participation in gifted programs in Saudi Arabia. However, for future reference, the perception of student giftedness by Saudi Arabia female teachers needs to be further explored through the same or similar procedures, but studying more representative samples.

It is worth mentioning that there are some studies that used intelligence tests to decide on the concurrent validity teacher nominations (Alnafi, Alkatie, Aldobaiban, Alhazmy, & Alseleem, 2000). However, it is agreed that objective data such as performance in the enrichment programs might be more appropriate criteria for the evaluation of the quality of teacher nominations (Shore, Cornell, Robinson, & Ward, 1991). This is because the teachers take into consideration the overall characteristics of gifted students in the nomination processes though students' scores in the intelligence test may not reflect such characteristics as the motivational and personality traits. Therefore, further research is needed to compare students' actual performance with their scores on the current scale.

Attention must be drawn to the fact that despite the ease of administering this scale and the clear statement of its items, there is still a need for training the

kindergarten female teachers in using the scale. Further, more work is needed to design tools for identifying gifted children at an early age in the Arabian environment taking into account the peculiar features of these environments.

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