11 The Behavioral Characteristics of Kindergarten Gifted Children in Saudi Arabia: Construction and Validation of a Scale

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The use of teacher nominations to identify and select gifted children 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 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). Because teachers are closely attached to their students during their years of study, they are able to recognize children who show high aptitudes at different age levels.

Although teacher nomination constitutes one of the most common methods for identifying gifted children, this method came under scrutiny by many researchers (e.g., Hadaway and Marek-Schroer, 1992; Neber, 2004). The main drawback in using teacher nomination lies in the teacher's ability to observe the gifted behavior objectively (Slabbert, 1994; Smutny, 2000; Torrance and Safter, 1986). In a meta-analysis of studies about the accuracy of teacher nomination of gifted children, Gear (1976) reported accuracy rates between 4.4% and 48%. Some of the reasons for this low accuracy rate are that teachers are not well trained and do not have enough knowledge of the characteristics of gifted children (McBride, 1992). Gross (1999) has found that female

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kindergarten teachers who did not receive any training in gifted educa-
tion tended to exaggerate the abilities of children who show cooperation
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 a student was 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 that distinguish gifted children, help in
increasing the teachers' competency through raising their awareness
about giftedness (Hill, 1992; Pardeck, Pardeck, & Callahan, 1990; Sil-
verman, Chitwood, & Waters, 1986).

This led many researchers to try to increase the reliability of this
process by building up the scales of behavioral characteristics for the
gifted, which became a common tool for nominating students to gifted
programs. Therefore, researchers' concerns have been directed toward
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 chil-
dren for gifted programs (Davis & Rimm, 2004; Feldhusen, Hoover, &
Sayler, 1990; Gagné, 1999; Ma'jeeni, 1997; Renzulli et al., 1997; Silver-
man, 1997–2004).

Literature shows that gifted children reveal clear differences in de-
velopment that parents and teachers can evidently observe (Chen, Wang,
Lo, Chen, & Kuo, 2004; Liu, 1999). The early development of speech,
movement, and reading are considered remarkable signs of intellectual
giftedness. When these characteristics appear together at an early age
they reflect an early development in intellectual ability (Jackson, 1992).
Staines and Mitchell (1982) have noticed that most children vocalize
their first words at the age of 12 months, while gifted children start to vo-
calize at the age of 10 months. At the age of 18 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 11 months.

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They also acquire a larger vocabulary, which helps them to form sentences that are more complicated. These differences increase noticeably at the age of 4½. The higher the level of giftedness, the more these differences increase and become easily noticed. Bryant (1989) studied the characteristics of gifted children who started reading at 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.

This development of speech in the case of the highly gifted child may occur simultaneously 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, and 37% exhibited more imaginative expression. On the average, highly gifted children vocalized their first words at the 9th month and were able to read well before they reached their 4th year.

These results concur with the findings of Gross's 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 causative relations, and the ability to read at an early age. Moreover, Smutny (1998) has noticed a set of behavioral characteristics that are exhibited by gifted children at their 4th, 5th, and 6th years of age in response to educational activities at home or at 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 for imaginative expression, using previous learning experiences in new situations, exhibiting high ability to organize things logically, discussing ideas thoroughly, learning quickly and easily, taking initiative, showing keen powers of observation, making up good stories, and love for reading.

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These characteristics generally concur with the results of Rogers's study (1986). Rogers 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 letters of the alphabet when they reached 2 years, 31% managed to know written words when they reached the age of 2 years, 50% managed to read well when they reached the age of 4 years, 81% dealt with the games of "piecing together" in a good way when they reached the age of 3 years, 61% managed to deal with time and to tell the time exactly at the age of 5, and 2% managed to count from 1 to 10 before they reached the age of 3 years.

In view of that, many rating scales of behavioral characteristics of gifted children have been developed. For example, Renzulli and others (1997) have developed *Scales for Rating the Behavioral Characteristics of Superior Students (SRBCSS).* These scales are used in the stages from elementary to secondary education and consist of 14 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 the *Purdue Academic Rating Scale*, which is used at the secondary level. Gagné (1999) has also published rating scales to identify multiple talents through ratings by peers and teachers, and self-assessment for cognitive abilities, academic talents, social skills, physical and sport abilities, and technological and artistic talent.

In Arab countries, several rating scales have been developed and/or translated into the Arabic language to be used at primary, intermediate, and secondary levels. In Jordan, Alrosan and Alsoror (1998) have developed a modified Jordanian version from *Gift Scale* for identifying gifted children at the primary level. The results of the study revealed that this scale has an acceptable degree of reliability and validity. In addition, Alrosan and others (1990, cited in Alrosan, 2006) have developed an adapted Jordanian version of the *Pride Scale* for identifying gifted children at the preschool stage. The factorial analysis revealed the existence of five 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 of the *Gifted Classification Scale* that was developed by Johnson (1979). This scale consists of five fields. These fields are academic distinction, general mental ability, creative thinking,

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leadership, visual and performing arts, sport games, and psychomotor ability.

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 has 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 and Maoz (2000, p. 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 requires the utilization of formal and informal measures obtained from many resources in a wide variety of settings.
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 nonprofit organization officially established with a royal decree. The main purpose of MAWHIBA is to serve as a reference authority in identifying gifted Saudi individuals and contributing to the fulfillment 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 Saudi society.

Recently, MAWHIBA has started enrichment programs for nurturing giftedness along various stages of schooling, beginning with the elementary stage. In 2005 MAWHIBA planned for extending these programs to include kindergarten children. One of the main obstacles to 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 has increasingly been recognized that teachers can 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 behavioral scales to guide their nominations in the 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., Aldimati, 2004; Alfhaid, 1993; Alnafi, Alkatie, Aldobaiban, Alhazmy, & Alseleem, 2000). Yet, all these attempts focused on the stages of primary, intermediate, and secondary levels 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 preschool children that can be used by female kindergarten teachers[1] in the process of the initial screening of gifted children, in order to provide special educational services to gifted children 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 to 6 years old has been chosen as a target group for this study for many reasons; among them are the pivotal role of the child in the first five years and its profound impacts on mental development and the readiness for learning, and the fact that identification of 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 to identify the gifted, parents and teachers will be enlightened about the distinguishing behavioral characteristics and abilities of gifted children. In addition, to our knowledge, 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, first, from its ability to create a scale that contributes to the early identification of gifted children and at the same time considers the cultural and environmental features

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of the Saudi context. Second, there is a felt need in the Saudi society for feasible and flexible tools that enable teachers and parents to identify the characteristics of 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 kindergartens, in the process of identifying the gifted and utilizing the services presented to them.

Specifically, this study aims to: (a) develop a scale of behavioral characteristics for gifted children at the kindergarten stage; (b) ensure reliability and validity of the scale; (c) define differences between the means of teachers' ratings for both males and females on the different dimensions of the scale; (d) define differences between the means of teachers' ratings for the three age groups on the different dimensions of the scale; and (e) define differences between the means of teachers' ratings for gifted and nongifted on the different dimensions of the scale.

METHOD

Participants

The participants in the study included 539 kindergarten children from Riyadh, Jeddah, and the eastern province 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 had known the child she evaluated for a period of no less than one school year. Participants who did not complete answering the scale were excluded in the analysis of the results.

Procedure

Researchers reviewed the literature in the field of behavioral characteristics of gifted children. They also reviewed a number of scales that have been developed in Arab and other environments. In the light of this, the blueprint of the scale of behavioral characteristics for gifted children from 3 to 6 years of age was formed. The blueprint of the scale included 60 items pivoted around three dimensions. These dimensions are: cognitive characteristics, personality characteristics, and

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motivational characteristics. The scale was shown to a jury of 18 experts in the field of gifted education. Then the researchers modified and/or deleted some items of the scales in the light of the jury members' recommendations.

The researchers 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, how they were to be used, and how to deal with the scale regarding the formalities. The scale was sent to the directors of kindergarten in Riyadh, Jeddah, and the eastern province to hand over to the kindergarten 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 was documented, in addition to the observations documented through the procedures that accompanied the application process. These observations represented the difficulty of dealing with certain items that need the students' mothers' cooperation to be answered, such as the following: revealing an interest in time, managing to distinguish alphabetical characters at an early age, and 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 and 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 these findings, the scale was revised to include 43 items and then sent again to the directors of kindergarten in Riyadh, Jeddah, and the eastern province, who handed it over to the kindergarten teachers in these neighborhoods and explained the objectives of the scale and how to apply it. Fifty teachers from 20 kindergartens took part in the application of the scale. Each teacher evaluated between 10 and 15 male and female children from a group of children with high abilities,

with the condition that she had dealt with those children for a period of no less than one school year. In addition, the head teachers of these kindergartens were asked to nominate the three kindergarten children whom they believed were most gifted in light of their portfolios, and then rate them on the behavioral characteristics scale. Then the scales were cleared out and analyzed by Statistical Package for the Social Sciences (SPSS).

RESULTS

Validity of the Scale

The scale was sent to a jury of 18 specialists in the field of gifted education, to judge the appropriateness of each item regarding its statement, its belongingness to the field, and the appropriateness of the fields for evaluating the peculiar characteristics of gifted children. The researchers rewrote 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 Varimox rotation yielded five dimensions of behavioral characteristics of gifted children. These dimensions are: motivation and the desire to learn, 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 11.1.

Reliability of the Scale

The reliability of the scale has been calculated through split-half coefficient for the scale items by using the 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 has a high degree of reliability.

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Table 11.1

PRINCIPAL COMPONENT FACTORING WITH VARIMOX ROTATION OF THE SCALE ITEMS

ITEM	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				
Has intense involvement in work (12)	.532				
Is 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			
Explains ideas clearly (18)		.548			
Began reading at an early age (19)		.476			
Sees connections between unconnected things (5)		.473			
Raises different questions (26)			.694		
Has unusual ideas (25)			.665		
Is keenly observant 23)			.655		
Possesses an outstanding memory (27)			.647		
Learns skills rapidly and efficiently (21)			.585		
Is spontaneous (22)			.565		
Has a strong tendency for inquiry (28)			.515		

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Table 11.1

**PRINCIPAL COMPONENT FACTORING WITH VARIMOX
ROTATION OF THE SCALE ITEMS (*CONTINUED*)**

ITEM	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
Has a long attention span (41)			.495		
Is able to grasp complex ideas (29)			.474		
Has multiple skills (33)				.741	
Is an independent thinker (37)				.683	
Is extremely active (40)				.628	
Has a high energy level (43)				.531	
Has leadership skills (34)				.520	
Has a keen sense of humor (6)				.511	
Is imaginative (35)				.419	
Is outspoken (36)				.410	
Prefers playing with older children (42)				.407	
Possesses good physical skills (38)				.401	
Is sensitive to critics (39)				.400	
Deals with numbers easily and accurately (31)					.760
Has a high ability to understand numeric concepts (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

Only Salient Loadings of 0.40 or Above are Shown.

Note: The number in parentheses following each item indicates the item numbers in the scale.

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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, linguistic characteristics .88, learning characteristics .80, personality characteristics .81, and logical/math thinking .66. All of 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 (five items). Moreover, the children's scores on scale dimensions were correlated with their total scores on the scale, as shown in Table 11.2.

It is clear from Table 11.2 that all the dimensions are highly correlated with the total score, and the correlation coefficients have ranged from .67 to .87. These coefficients are accepted and statistically significant. This also points to the consistency of the dimensions that the scale includes. The correlation coefficients among the five dimensions were high, but the correlation coefficients among mathematical thinking, linguistic characteristics, and 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, the t-test formula was run to children's scores on the five dimensions of the scale. Results are shown in Table 11.3.

Table 11.3 shows that there are no statistically significant differences between mean scores of males and females on the scale as a whole, in the learning characteristics dimension, and in the personality 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 linguistics characteristics favoring females ($p < .035$ 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. They also point to the validity of the scale to diagnose characteristics of gifted children. In addition, these results document the success of female teachers in accurately deciding upon distinguishing characteristics of gifted children in kindergarten, which in turn reflects the validity of the scale in the initial screening of those children.

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Table 11.2

THE CORRECTION COEFFICIENTS BETWEEN THE FIVE DIMENSIONS AND THE TOTAL SCORE OF THE SCALE

DIMENSIONS	MOTIVATION	LINGUISTIC CHARACTERISTICS	LEARNING CHARACTERISTICS	PERSONAL CHARACTERISTICS	LOGICAL /MATH THINKING
Motivation and desire for learning	–				
Linguistic characteristics	.678	–			
Learning characteristics	.706	.624	–		
Personality characteristics	.607	.615	.615	–	
Logical/math thinking	.533	.485	.385	.323	–
Motivation and desire for learning	.868	.799	.810	.828	.672

Table 11.3

T-TEST RESULTS OF DIFFERENCES BETWEEN MALES AND FEMALES ON THE SCALE DIMENSIONS

DIMENSIONS		NO.	M	SD	F-VALUE	SIG. (P)
Total score	Males	253	182.53	27.03	1.97	.161
	Females	286	185.54	23.14		
Linguistic characteristics	Males	253	50.23	8.43	4.46	.035
	Females	286	51.65	7.22		
Learning characteristics	Males	253	28.76	5.12	6.63	.010
	Females	286	30.15	4.35		
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		
Motivation and desire for learning	Males	253	22.09	6.44	3.98	.047
	Females	286	21.82	5.52		

Differences Between Age Groups

To examine the differences between children's mean scores at the three different age groups (3–4, 4–5, and 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 11.4 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.

It is clear from Table 11.4 that there are statistically significant differences among the three age groups in the total score of the scale (F[2,538] = 13,069; p < .001). Also there are statistically significant differences among 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 logical/math thinking (F[2,538] = 6,068; p < .002).

To examine the source of these differences among age groups, the Scheffé Test was conducted on the total score of the scale as well as its five dimensions. Results of the Scheffé Test revealed that there were significant differences among the three age groups, favoring older children

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Table 11.4

ANOVA RESULTS FOR THE DIFFERENCES AMONG THE THREE AGE GROUPS

DIMENSIONS	SOURCE OF VARIANCE	SS	DF	MS	F-VALUE	SIG. (P)
Total score	Between groups	14226.53	2	7113.26		
	Within groups	291141.93	536	543.17	13.069	.001
	Totals	305368.46	538			
Motivation	Between groups	1260.378	2	630.20		
	Within groups	23202.47	536	43.29	14.558	.001
	Totals	24462.85	538			
Linguistic characteristics	Between groups	234.35	2	117.18		
	Within groups	13115.29	536	24.469	4.789	.009
	Totals	13349.64	538			
Learning characteristics	Between groups	529.588	2	264.79		
	Within groups	10140.82	536	18.92	13.996	.001
	Totals	10670.41	538			
Personality characteristics	Between groups	859.279	2	429.64		
	Within groups	239575.12	536	44.73	9.605	.001
	Totals	24834.40	538			
Logical/math thinking	Between groups	186.45	2	93.23		
	Within groups	8235.20	536	15.36	6.068	.002
	Totals	8421.64	538			

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 Nongifted in the Scale Dimensions

On the differences between means of teachers' ratings for both gifted and nongifted children on the scale of the behavioral characteristics of gifted children, the t-test formula was run to children's scores on the five dimensions of the scale. Results are shown in Table 11.5. This table shows that there are statistically significant differences between mean

Table 11.5

T-TEST RESULTS OF THE DIFFERENCES BETWEEN GIFTED AND NONGIFTED CHILDREN ON THE SCALE DIMENSIONS

DIMENSIONS		NO.	M	SD	F-VALUE	SIG. *(P)*
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		

scores of gifted and nongifted children on all the dimensions of the scale, favoring gifted children ($p < .001$). This documents success of female teachers in accurately deciding upon distinguishing characteristics of gifted children in kindergarten, which in turn reflects validity of the scale in the initial screening of those children.

DISCUSSION

This study aimed at developing a scale for identifying the behavioral characteristics of gifted children from 3 to 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 11.1, the characteristics of gifted students, as perceived by their teachers, fell nicely into five domains of behavioral characteristics, namely, motivation and the desire for learning, linguistic characteristics, learning characteristics, personality characteristics, 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

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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. On the other hand, 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 was 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 by including additional items.

The internal consistency of the scale was calculated through correlating scores on the five dimensions, and the total score resulted in values ranging from .67 to .87, which are statistically significant. In addition, the correlative relations among 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 learning characteristics. These results conform to those cited in literature on gender differences that shows 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 among 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 younger (3–4). This indicates that motivation and linguistic characteristics, characteristics of learning, personality characteristics, and mathematical thinking for children develop with age. This presents additional 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 female Saudi Arabia 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 et al., 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 fact that the teachers take into consideration the overall characteristics of gifted students in the nomination processes through students' scores in the intelligence test may not reflect such characteristics as 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 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.

NOTE

1. All kindergarten teachers in Saudi Arabia are females.

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