The Difference between Gifted and Ordinary Children in Jordan in their Use of Intuitive Rule "same A- same B"

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ABSTRACT--- ***The primary purpose of this study was to examine the difference between gifted and ordinary students in Jordan in their use of intuitive rule "Same A-Same B". Participants of the study consisted of (240) students divided into two groups (120 gifted, and 120 ordinary students), I used a questionnaire including 4 tasks relates to the rule " same A- same B". An analysis of variance was carried out for correct responses for intuitive rule " Same A- Same B" with the factors giftedness (ordinary, gifted) and grade level (10^{th} 11^{th} 12^{th} grades). Results indicate that there is a significant differences were between gifted and ordinary students in their responses to tasks embedded in rule "Same A-Same B: The gifted students gave more correct responses than the ordinary students.***

Keywords--- Gifted**,** Ordinary Children, Intuitive Rule "same A-same B".

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1. LITERATURE REVIEW

The literature review includes two parts: Intuitive rules and giftedness.

Intuitive Rules:
In this Chapter I shall briefly describe and discuss intuitive rules:

Same A – Same B

This intuitive rule is reflected in students' responses' to mathematics and science tasks in which students are presented with two objects (or systems) equal in a certain quantity A ($A_1=A_2$), but different in another quantity B ($B_1 \neq B_2$). The students are asked to compare B_1 and B_2. In many tasks, a substantial number of students claimed that $B_1=B_2$ because $A_1=A_2$ (Stavy & Tirosh, 2000).
Some related examples are:

a. Length and distance

Piaget , Inhelder and Szeminska (1960) asked young children to compare the length of a straight line with that of a wavy line. The lines were of different length but they began and finished at parallel points on the page. Piaget et al. (1960) reported that 84 % of children aged four to five incorrectly replied that the lines were equal in length. A typical response was “they are both the same length [indicating the end-points]”. Piaget et al. interpreted this response by referring to children’s development of the concept of length. We may also regard this response as a case in which the intuitive rule: “Same A (distance between end points) – same B (length of lines)” is activated.

b. Area and Perimeter

Incorrect responses of the type “same area- same perimeter” or same perimeter- same area” were reported in many studies on students’ misconception in geometry. Dembo, Levin, & Siegler (1997) in their study in geometric misconception on students’ conceptions of area and perimeter, presented students attending ultrathodox schools aged 12 to 14 years old, with that of peers attending mainstream schools 16 to 18 years old (these groups were of special interest because both value education highly and send essentially all children to school, but 1 group receives extensive instructions in mathematics and science and the other receives almost none) with a series of tasks. Each task which involved a given geometric figure; then they transformed it, in front of the subjects, into another figure, keeping the perimeter the same. The students were then asked to compare the areas of the two figures (for instance, a square was transformed into a diamond, a circle into an ellipse). Despite the ultrathodox 12 to 14 years old having received no instructions in geometry, they more often solved the geometric misconceptions problems than did mainstream peers who had received extensive instruction in the subject. Dembo and colleagues (1997) reported that many of the students at

these grades levels claimed that “same perimeter- same area”. Clearly this response is in line with the intuitive rule “Same A-Same B”.
Ronen (2001) presented children in grades K to 9 with “thread” task (the perimeter was kept, and the area was changed). Here, a notable number of children who conserved the length “conserved” the area as well. Students who conserved both the perimeter and the area mainly used identity arguments to justify their answers to the area task (e.g., “It’s the same thread; therefore it’s the same area”). As in the previous study, the percentages of the incorrect responses increased with age.
There are other studies that reported similar incorrect responses (e.g., Hirstein, 1981; Hoffer and Hoffer, 1992; walter, 1970). These studies interpreted students’ responses as resulting from a misunderstanding of the relationship between the concepts of area and perimeter (Stavy and Tirosh, 2000).

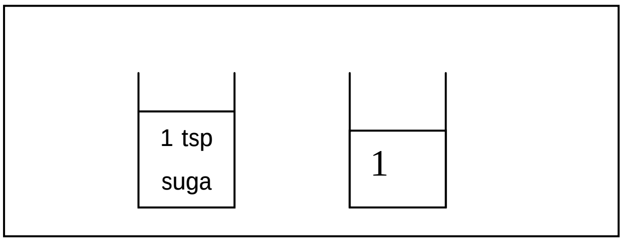
c. Weight and Volume

Ronen (2001) presented children in grades K to 9 with two vials containing equal amounts of water. Both vials were corked, and a tube was inserted through the cork. One of the vials was heated and the water expanded, and, consequently, its level rose in the tube. The difference between the levels of water in the two tubes was visible. The children were asked to compare the weights and the volumes of water in the two vials before and after heating. In this case, the weight of the water was conserved (W1= W2), but the volume, after heating, was larger. Ronen (2001) reported that children below grades 4 did not conserve the weight, claiming that the he1ted water weighed more than the unheated water because “the level of water is higher”. From grade 5 on, most students correctly answered this task. In respect of the volume before and after heating, most children in the lower grades correctly judged that the volume of the heated water was larger, claiming that “the level of water is higher’. Most sixth- and seventh – grades claimed that the volume of the heated water was equal to that of the unheated water. In the upper grades there was an increase in correct judgments, accompanied by reference to the particulate nature of matter. Similar results were reported on other studies made by Megged, 1975; Piaget and Inhelder, 1974 (Stavy and Tirosh, 2000).
These data show that at certain grades students “conserved” both weight and volume. These high percentages of reasoning that “same water- same weight- same volume” suggest the coercive effect of the intuitive rule “Same A- Same B” which in this case, until a certain age, overrules obvious perceptual input. Some students even explicitly said that perceptual differences may mislead and should not be relied on.

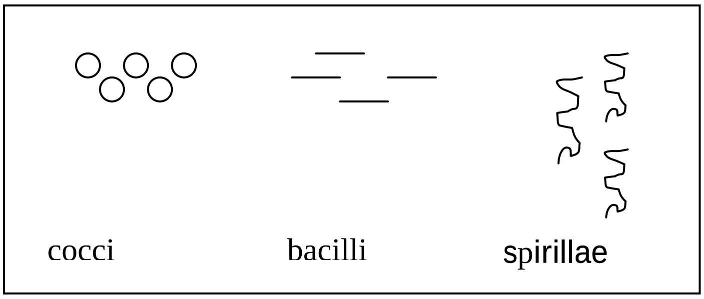
d. Concentration and temperature

Children aged four to fourteen were presented with two cups of water and were asked about the relative sweetness of the water after sugar was added to the cups. One cup was full of water and one teaspoon of sugar was mixed into it. The same was done with the other, same sized but half – full, cup. The children were asked whether they thought the sweetness of the sugar water in the two cups was the same or not, and if not, in which cup the water was sweeter.
This task was included in a study on the development of children’s conception of concentration (sweetness) conducted by Stavy, Strauss, Orpaz and Carmi (1982). Most of the young participants (four to eight years old) argued that each cup contains one teaspoon of sugar and water and, as a consequence they must be equally sweet.
Very similar results were obtained in regard to the development of children’s conceptions of temperature (Ravia, 1992; Stavy & Berkovitz, 1980; Strauss & Stavy, 1982). Children were asked (1) to compare the temperature of different amounts of water heated by the same number of candles for the same duration of time (2) to compare the temperature of different amounts of water cooled by the same number of ice cubes. Young children (four to nine years old) incorrectly claimed that “ the temperature of water in the two cups is equal because both were heated by the same number of candles” and that “ the temperature of water in the two cups are equal because both are cooled by the same number of ice cubes”. Starting from age nine, most children correctly judged the relative temperature of the heated water and that of the cooled water.

The behaviors of the young children in these studies were often interpreted as resulting from non – differentiation between mass and concentration, or non – differentiation between heat and temperature (Erickson, 1979; Wiser & Carey, 1983). According to the intuitive rules theory such incorrect responses could be viewed as applications of the general rule “Same A (same amount of sugar/ice cubes/candles) – Same B (same sweetness/temperature)”.



e. Resistance of bacteria



Livne (1996) studied biology major high school student's conceptions of the ratio of surface area and volume and its role in biological phenomena.

The following task, related to the resistance to dryness of bacteria, was included in a written questionnaire submitted to about 180 students in grades 10, 11 and 12.
Bacteria are usually shaped spherically (cocci), rod-like (bacilli) or like a spiral (spirillae). The above drawing represents bacteria from each of these three types. The cell volume of each of these bacteria is equal.
Is the resistance to dryness of these three types of differently shaped bacteria equal / non-equal? Explain why?
If you think there is a difference, which of these three types of bacteria is most resistant to dryness? Why?

All the participant students received formal instructions related to the ratio of surface area and volume and its role in biological phenomena. About a third of the students claimed, in accordance with the intuitive rule "Same A – Same B", that "the cells have the same volume and therefore their resistance to dryness is the same".

Giftedness:
An important investigation was started by Terman who published a five volume report on the selection of about 1000 children with an IQ of above 140 which were selected from a population of one quarter of million children in California, and follow-up study for a period of 25 years. The study continues today with investigations of the children and grandchildren of the original sample,. This was considered (and still is) the most important investigation of giftedness ever done.

Among the many findings, the following ones are of importance. Gifted students have higher ability in performing their school assignments and duties. They are more intellectually developed than their classmates. They do well in all school subjects. The percentage of gifted students who attended graduate studies is higher than the percentage of ordinary students (Davis and Rimm, 1985, pp. 3-14).
Terman, and Odeh, (1959) studies, as well as those of Gallgher (1979) showed that the physical characteristics of gifted children are better than those of their normal peers.
In the mid-1960s, an exciting gifted education movement began in the United States, one which includes federal and state legislation, special funds, new programs, and very high interest and commitment by teachers, administrators and educational researchers (Davis and Rim, 1985, p.15; Anastasi and Foley, 1959). Currently, this field is growing in importance in the education domain, as more and more programs are created to highlight this domain.
Academic coursework was telescoped for bright students. College courses were offered in high schools; foreign languages were taught in elementary schools. Public and private funds were earmarked for training in science and technology. Acceleration and ability grouping were used, and efforts were made to identify gifted and talented minority students. New mathematics and science curricula were developed, most notably the School Mathematics Study Group (SMSG), Physical Science Study Committee (PSSC), and Biological Science Curriculum Study (BSCS). Virtually all large school systems have initiated new programs. Many individual schools and even individual teachers, not waiting for formal district action, initiated special services and training for gifted children. At that time many researchers developed

diagnostic tests, ways of evaluating specific programs for gifted students, and many related articles were published (Davis and Rimm, 2004).

The field of gifted education continues to evolve toward the close of the twentieth century. Advancements in education and psychology brought empirical and scientific credibility to this field. Research on mental inheritance, subnormal children, construction of instruments to measure both the sub and super normal, and their realization that graded schools could not adequately meet the needs of all children.

Recently, the National Association for gifted children published a report in which it was claimed that the needs of gifted students are not adequately met (Colangelo, Assouline and Gross, 2004). Consequently, a call was made for additional research on giftedness and support for gifted children.

***Definitions of gifted children**:*

Spearman used the term "genius" to identify gifted children. He concentrated on mental ability, represented by the IQ (Intelligence Quotient) and considered it the only measure that applies in the definition of the gifted child as it is considered the separating point between gifted and normal children. In the 1950s and 1960s of the 20th century, other definitions for the gifted child had appeared. They emphasized the measure (standard) of mental ability (Newland, 1976, p.14; Stephens & Karnes, 2000).

This multi- talented approach, which considers a number of measures in defining the gifted child was adopted by the United States Office of Education, and enacted into law by the US Congress in the Gifted and Talented Children's' Act. The definition states that gifted children and, whenever applicable, youth who are identified at the pre-school, elementary, or secondary level as possessing demonstrated or potential abilities that give evidence of high performance capability in areas such as intellectual, creative, specific academic or leadership ability or in the performing and visual arts, and who by reason thereof require services or activities not ordinarily provided by the school.

By 1988, this definition had been adopted into legislation by 39 US States since it defined giftedness more broadly than simply in terms of IQ, while also offering many services to different kinds of gifted and talented children (Milgram, 1989).

The past three decades witnessed substantial theoretical efforts to define the construct giftedness. Borland's (1989) defines giftedness as those students in a given school or school district who are exceptional by virtue of markedly greater than average potential or ability in some area of human activity generally to be the province of the educational system and whose exceptionality demands special-education needs that are not being met adequately by the regular core curriculum (Stephens & Karnes, 2000).

Cassidy and Hossler (1992) argued that gifted students are those that perform at remarkably higher levels than others of their age, experience, or environment .These children exhibit high performance capacity in intellectual, creative, and or artistic areas and unusual leadership capacity, or excel in specific academic fields. They require services or activities not ordinary provided by the schools .Outstanding talents are present in children and youth from all cultural groups, across all economic strata and in all areas of humans endeavor (Bonner, 2000; Maker, 1996).

Clark's (1997) giftedness definition is as follows: "Giftedness is a biologically rooted concept that serves as a label for a high level of intelligence and indicates an advanced and accelerated development of functions within the brain including physical sensing, emotion, cognition, and intuition. Such advanced and accelerated function may be expressed through abilities such as those involved in cognition creativity, academic aptitude, leadership, or the visual or performing arts (Clark, 1997 p.112).

Currently, there is no one, agreed upon theoretically based definition of giftedness. The definition of giftedness is a central feature of every planned program, and a feature that must be reviewed with great care.

As a final comment on the definition challenge, we repeat that:

1. There is no one agreed upon definition of "giftedness".
2. The specific, chosen definition will determine the selection of subjects, instruments and procedures.

Most current definitions of giftedness have some common elements:

- General intellectual ability
- Specific academic aptitude
- Creative or productive thinking
- Leadership ability
- Visual and performing arts
- Psychomotor ability

2. STATEMENT OF THE PROBLEM

Many teaching and learning theories assume that knowledge about children's conceptions and ways of thinking could significantly improve science education. This study aims at examining the differences between gifted and ordinary students in Jordan in their use of the intuitive rule “Same A – Same B". The goals of this study are to explore the following question:

1. Are there significant differences between gifted and ordinary students in their use of the second intuitive rule “Same A – Same B”?

3. METHODOLOGY

Sample

Students from two schools in the Hashemite Kingdom of Jordan participated in this study. The first school is The Jubilee School for Gifted Students and the second school is Amina Bint Wahab school for ordinary students.This sample of students consists of 240 students divided as follows: Gifted students: This group consists of 3 grades (10-12), 40 children from each grade. Ordinary students: This group consists of 3 grades (10-12), 40 children from each grade.

Instrument

A questionnaire including 4 tasks related to the intuitive rule "same A-Same B" was developed for this study.

Procedure

The following steps were taken:

To begin with, the researcher received permission from the Ministry of Education in Jordan, and from the administration of Al-jubilee school for gifted students, and Amina Bint Wahab School for ordinary students to conduct the interviews in the two schools.

The students of the two groups (gifted and ordinary) were told about the nature of the study. Before meeting with the students, the school received permission from the students’ parents to participate in this study. This study was implemented during one month, in the second term of the academic year 2000 / 2001. The researcher interviewed each student. Each interview took 30 to 35 minutes. The researcher demonstrated the tasks. The students’ answers were audiotaped and transcribed.

Data analysis

After transcribing the interviews, I related to two variables: the judgment, and the justification. I did it for each task.
The judgments were first labeled as correct, incorrect or no response for each task. Then, a more subtle coding was used for the incorrect judgments: Incorrect judgments in-line with the relevant intuitive rule and other, incorrect judgments.
The justifications were categorized for each task for each student according to previous categorization of these tasks (Stavy and Tirosh, 2000). New types of responses were categorized by me. Then I discussed the categorization of these responses and came to an agreement on the few responses that were categorized differently (about 5% of all the data).
The frequencies of the judgments and of the related justifications for each task for each group (gifted, ordinary) for each grade level (10^{th}, 11^{th} , 12^{th}) were then calculated (see Tables 2-5 in Results).
The means of correct responses and standard errors for intuitive rule "Same A-Same B" for each group and for each grade level were calculated (see Table 1 in Results). An analysis of variance was carried out for correct responses for intuitive rule "Same A-Same B" with the factors giftedness (ordinary, gifted) and grade level (10^{th} 11^{th} 12^{th} grades).

4. RESULTS

General desperation of the results to the intuitive rule "Same A-Same B"

Four tasks relate to the intuitive rule “Same A – same B “. I shall describe the results related to each of the tasks as it relates to each group (gifted and ordinary) and to each grade level (10, 11, 12). The results of the study are addressed by each objective.
Comparison between gifted and ordinary students in different grades. As mentioned before, students from grades 10, 11 and 12 from the two groups (gifted and ordinary) were given various tasks related to the intuitive rule "Same A- Same B".

Table 1 provides information about the means and the standard deviation of correct responses by rule and grades of both the gifted and the ordinary students. An analysis of variance was carried out for correct responses for intuitive rule "Same A-Same B" with the factors giftedness (ordinary, gifted) and grade level (10^{th} 11^{th} 12^{th} grades). The only significant differences were between gifted and ordinary students in their responses to tasks embedded in this intuitive rule.

Table 1: Means (and standard errors) of Correct Responses to the Intuitive Rule "Same A-Same B" by Grade and Giftedness (in %).

Giftedness	Ordinary				Gifted			
Grades / Rules	Total	10	11	12	Total	10	11	12
Same A-Same B	43 (14.5)	43 (12.9)	41 (18.9)	47 (12.5)	73 (6.9)	69 (8.7)	72 (8.3)	77 (4.1)

Intuitive rule: “ Same A – Same B ” Results for each task

For tasks refer to the intuitive rule “Same A – Same B”.

I shall describe students' judgments and justifications related to each of the tasks: the results related to each group (gifted, and ordinary group), and to each grade level (10, 11, 12).

4.1. Families Task

In the families task two families are described: one family with two children, and another family with four children. The students were asked: Is the probability that the first family has one son, and one daughter larger than / equal to / smaller than that of the probability that the second family has two sons and two daughters? .

The correct answer to this task is that the probability that the first family has one son and one daughter is larger than the probability that the second family has two sons and two daughters.

In this task, high percentages, (70%) of both the gifted and the ordinary students in all grade levels provided correct answers (see Table 2). These high percentages could probably be attributed to the fact that children in Jordan have experience with large families. Indeed, students referred to this experience in their responses. The frequent justification that was given by the students in all grade levels to the correct response was: “The first family has a smaller number of children, than the second family, I know from experience”.
Two types of incorrect responses were provided to this task. The first one was that the second family has more chances to have the same number of boys and girls. The percentages of the students who incorrectly claimed so were very low in all grade levels; the main justification was “the second family has larger numbers of children and thus more chances to have the same number of boys and girls.
The second incorrect response was that the two families have the same chance to have same number of boys and girls. The justifications were: “it is 1:2 for the two families”, “it is 50% for each family”. These responses are in line with the second intuitive rule “Same A- same B”.

Table 2: Distribution of Responses (in %) by Group, and by Grade, to the Families Task

	Ordinary			**Gifted**		
Grades	**10**	**11**	**12**	**10**	**11**	**12**
Responses / (n)	(40)	(40)	(40)	(40)	(40)	(40)
1. **First Family***	70	77.5	70	70	75	77.5
1. I know from experience	70	77.5	70	70	75	77.5
2. Second Family	10	10	5	15	10	22.5
1. Second family have larger numbers of children and more chances	10	10	5	15	10	22.5
3. Same Chance	20	12.5	25	15	15	0
1. Its 50% for each family	10	7.5	17.5	10	10	---
2. Its 1:2 for the two families	*	5	7.5	5	5	---

* Correct answer

4.2. Expansion Task

For this task I used two vials containing equal amount of water. Both vials were corked, and a tube was inserted through the cork. One of the vials was heated, the water expanded, and consequently its level rose in the tube.

Students were asked to compare the volume of water in the two vials (1 and 2) before and after heating .
The correct answer in this case was that the volume after heating was larger (V$_1$ > V$_2$).

High percentages of the ordinary students and almost all the gifted students gave correct responses. The gifted and most of the ordinary students justified their responses by “the water has expanded” and “water goes up, so volume is larger” (see Table 3 below).

The incorrect response: “The volume in vial 1 is equal to the volume of vial 2” was offered more often by the ordinary students than by the gifted students. Two types of justifications were given by them. The first type in line with the intuitive rule “Same A- same B” were: “It’s the same quantity of water” and “The quantity is equal, so the volume is equal”, and “Nothing is lost from heated water”.

Table 3: Distribution of Responses (in %) by Group, and by Grade, to the Expansion Task

	Ordinary			Gifted		
Grades	**10**	**11**	**12**	**10**	**11**	**12**
Responses / (n)	(40)	(40)	(40)	(40)	(40)	(40)
1. **The volume of the unheated water is smaller***	60	67.5	65	92.5	95	87.5
1. Because the water is expanded	52.5	67.5	62.5	92.5	95	87.5
2. Water goes up, so volume is larger	7.5	---	2.5	---	---	---
2. The volume are equal in the two vials	40	32.5	35	7.5	5	12.5
1. Same quantity of water	35	25	32.5	7.5	5	5
2. The quantity is equal so the volume is equal	---	5	---	---	---	---
3. Nothing is change from heated water, there is no lost from the water	5	2.5	2.5	---	---	7.5

* Correct answer

4.3. Cylinders

In this task two identical rectangular (non-square) sheets of papers (sheet 1 and sheet 2), were presented. One sheet was rotated by 90^o. Then both sheets were folded and two cylinders were created, students were asked: Is the volume of cylinder 1 smaller than / equal to / larger than / the volume of cylinder 2? .

The correct answer to this task is that the volume of cylinder 2 is larger than that of cylinder 1.

Most of the gifted students in grade levels 10, 11, and 12 provided correct responses to this task. The percentages of correct responses among the ordinary students were low (did not exceed 35%). Most of the students in each group who provided correct responses claimed that “sheet 2 is wider, and bigger”, “sheet 2 is fat, and take more sand” and “sheet 2 covers more surface on the table”.

As expected, a substantial number of students answered in line with the intuitive rule “Same A – same B” that the volumes of the two cylinders are equal. The percentage of incorrect responses was higher in the ordinary students than in the gifted group. Two types of justifications were given by the students, “one is taller, and one is wider. That’s all” and “it is the same sheets nothing will change” (See table 4).

Table 4: Distribution of Responses (in %) by Group, and by Grade, to the Cylinders Task (Volume)

	Ordinary			**Gifted**		
Grades	**10**	**11**	**12**	**10**	**11**	**12**
(n) Responses	(40)	(40)	(40)	(40)	(40)	(40)
1. **Volume of cylinder 1 is smaller than cylinder 2***	25	12.5	35	52.5	60	75
1. Sheet 2 is wider and bigger	22.5	12.5	27.5	37.5	7.5	45
2. Sheet 2 is fat, and takes more sand	2.5	---	---	15	32.5	15
3. Sheet 2 cover more surface on the table	---	---	---	---	20	15
2. Cylinder 1 is equal to cylinder 2	75	87.5	65	47.5	40	25
1. One is taller and one is wider that's all	7.5	12.5	12.5	15	15	10
2. It is the same sheets nothing will change	67.5	75	52.5	32.5	25	15

* Correct answer

4.4. Percentages and perimeters

Students were presented with the following task:
Consider a square.
The width is increased by 20%, and the length is reduced by 20%.
Is the area of rectangle smaller than / equal to / larger than / the area of the square.?

The correct answer to this task is that the area of the rectangle is smaller than that of the square.
As can be seen from table 5, most of the gifted students correctly answered this task while most of the ordinary students provided incorrect responses to this task. Both groups of students gave two types of justifications to the correct responses: "The area of the square is larger", and "Square have equal sides but rectangle has unequal sides.

Two types of incorrect responses were provided to this task. The first one was that the area of both shapes is equal and the was that the area of the rectangle was larger.
For the first type, the area of the rectangle is equal to the area of the square, the students' justifications were that "it's the same percentage: 20% - it doesn't change" and that "by placing 20% of the rectangle in the square, the two signs become equal". These responses are in line with the second intuitive rule "Same A – Same B". For the second type, the area of the rectangle is larger than that of the square, the students offered two justifications: "rectangle has longer sides than the square and it is bigger ", or they stated that "it has a larger area".

Table 5: Distribution of Responses (in %) by Group, and by Grade, to the Percentages and Perimeters Task

	Ordinary			Gifted		
Grades	**10**	**11**	**12**	**10**	**11**	**12**
(n) Responses	(40)	(40)	(40)	(40)	(40)	(40)
1. **The area of the rectangle is smaller than square***	17.5	5	17.5	60	60	67.5
1. Square has equal sides but rectangle has unequal sides	12.5	5	10	35	25	15
2. The area of the square is larger	5	---	7.5	25	35	52.5
2. The areas are equal	60	77.5	60	37.5	20	20
1. It's the same percentage: 20% - it doesn't change	30	57.5	12.5	2.5	20	12.5
2. By placing 20% of the rectangle in the square, the two signs become equal	30	20	47.5	35.5	---	7.5
3. The area of the rectangle is larger than that of the square	22.5	17.5	22.5	2.5	20	12.5
1. Rectangle has longer sides than square and it is bigger	10	12.5	20	2.5	12.5	12.5
2. It has a larger area	12.5	5	2.5	---	7.5	---

* Correct answer

Rule 2: Summary of results

Most students in both groups gave correct responses to the first two tasks (families and expansion tasks). Still the percentage of the gifted students who answered the expansion tasks correctly is higher than that of the ordinary one. The other two tasks (cylinders and percentages) were answered correctly by most gifted students and incorrectly by most ordinary students. The differences between the performance of the gifted and ordinary students in the last three tasks could be attributed to the differences in students' ability to overcome the tendency to inappropriately use the conservation scheme when solving this problems. Moreover the last two tasks demand calculation which is often not performed due to the coercive nature of the intuitive rule "Same A –same B".

5. DISCUSSION

This study is embedded within the intuitive rule "Same A-Same B". This is the first study, within this framework that attempts to identify the differences between gifted and ordinary students in their use of the intuitive rule "Same A-Same B". The study was carried out in Jordan.

The results of this study showed that in the intuitive rule, "Same A – Same B" the differences between the performances of gifted and ordinary students are not significant. This finding is consistent with previous findings of Stavy and Tirosh (2000). They reported that the rule "Same A – Same B" appear to be applied in a nonuniform way. That is, in some tasks only young children responded in accordance with it while in others older students and adults reacted according to the rule. I see this tendency in my findings: it is clear that even gifted students provided incorrect responses to some tasks (cylinders task and percentages and perimeter tasks).

However, in general, the gifted students were less affected by the intuitive rules than ordinary students and their performance was better. This group was selected according to their school achievements, behavioral characteristics (motivation, independence, flexibility, persistence, communication, leadership, responsibility, self confidence, adjustment, and self control) a scholastic aptitude test (verbal, mathematical, logical reasoning) and a personal interview. It seems that one of these criteria or a combination of all or some of them also select for the ability to overcome the intuitive rules. Selection for school achievements may be related to the gifted students' advantage in the tasks which are related to school achievements. Selection according to scholastic aptitude may be related to gifted students' advantage in the tasks that require logical reasoning and selection for behavioral characteristics such as self control may be related to gifted students advantage in all tasks.

Three grade levels participated in this study, 10th, 11th, and 12th. My analysis reveals that the effect of the grade level on students' responses to the intuitive rule "Same A- Same B" tasks was not significant. Hence, it seems that the students kept applying this intuitive rule at more or less the same extent during their years of studies in high school. This suggests that a special intervention is needed to increase students' awareness of the impact of the intuitive rule "Same A-Same B" on their thinking.

6. REFERENCES

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