Science High School Students' Images of the Scientist before and after the Green Investigation with Scientists

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Abstract: The purpose of this study is to obtain science high school students' perceptions of scientists and their work before and after the Green Investigation program with scientists. This study also attempts to determine whether the program affected the participants' perceptions of scientists and their work. A modified DAST was carried out with 64 high school students. Findings revealed that Korean science high school students had normal perceptions of scientists, such as images of 20 to 30 year old males wearing laboratory coats and working alone in research labs with test tubes, flasks, and several machines in the background. After the intervention, students drew fewer typical items representing scientists and had significantly different perceptions of their work places between the pretest (M=1.69, SD=1.14) and posttest (M=1.96, SD=1.24, t=4.43, p<0.001) with the eta squared statistics (.24). These findings reflect the need for continued efforts of developing green investigation programs with scientists for students. Some future studies based on this study are also introduced.

Key words: Green investigation program, perceptions of scientists, work places of scientists, science high school students

Ⅰ. Introduction

The Korean government has been strongly advocating "Green Growth" since the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) 5th Ministerial Conference on Environment and Development in Seoul. For its national growth paradigm for the 21st century, the Korean government has put forth a green growth strategy that is aimed at achieving economic growth through green technologies. Under this strategy, science is expected to play a leading role in Korea's goals of green growth (Kim *et al.*, 2009; The National Assembly of the Republic of Korea: NARK, 2010).

In order to accelerate the green growth strategy, the Korean government recognizes the need to have students who have been taught and trained in environmental science, because they will be in charge of leading the green growth movement in the future. In response to this, the government assembled a set of plans meant to strengthen education on green growth, called "Green Growth Education". The Ministry of Education, Science and Technology has already begun revising current school curricula to offer in-depth environmental education to students (Gwangju Development Institute: GDI, 2010; Hong, 2008; Kim, *et al.*, 2009; NARK, 2010).

Under the green growth education strategy, both indoor and outdoor tasks have been presented in education. For example, this education can provide students with the opportunities they need to develop their understandings of environment through visiting natural history museums, science museums, institutes of biological resources, and ecoplexes as well as taking lessons from eco-friendly institutes and laboratories at universities. In addition, field trips to tidelands, swamps, and well-conserved forests have been suggested as educational places to

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be able to conduct green growth education (GDI, 2010; Chungnam Development Institute: CDI, 2009). An important part of this education is to foster student curiosity as well as develop environmental experiences that will encourage students to become scientists in the future. Specifically, environmental science should be carefully taught for high school students because they are at the critical stage to make a decision for their future (Kim *et al.*, 2009).

Science high school students are appropriate subjects to implement the green education program with because high school is built on the foundation of developing the abilities of scientifically talented students through scientific activities. In response to this expectation, the purpose of this study is to see what students' images of science are, and whether those images are changed after participating in a program that pairs them with a scientist conducting research in the field.

There have been many studies dealing with student perceptions of scientists and their work (Chambers, 1983; Finson, 2002; Gottfredson, 1981; Joo *et al.*,2009; Kim *et al.*, 2005; Kwon, 2005; Mun & Kim, 2008; Noh & Choi, 1996; Rosenthal, 1993; Song, 1993; Song & Kim, 1999; Thomas & Hairstone, 2003). The research has often been done by analyzing images of scientists at work, drawn by students or other populations of interest. Results of these studies indicate that students have stereotypical perceptions of middle-aged male scientists wearing lab coats and glasses. Studies done in Korea resulted in images of generally younger scientists than what is typically reported by other countries. Scientists who were dealing specifically with environmental issues had been drawn as wearing regular clothes and working in a field, using portable equipment and laptop computers (Joo *et al.*, 2008).

The factors that impact students' images of scientists include various sources primarily coming from outside of formal schooling (Flick, 1990; Kim *et al.*,2005; Schibeci, 1986; Song & Kim, 1999). This finding encouraged science educators to provide opportunities for students that would represent many different features of science by having students actively participate in lessons with scientists. There have been previous studies that discussed the results of some of these activities (Jeon *et al.*,2002; Lee *et al.*, 2002; Yoo *et al.*, 2007), and in general, these tasks helped students to transfer or change their images of scientists. For example, after interviewing a scientist on service performance assessment, high school students reduced the stereotypic image of a scientist, specifically in terms of wearing lab coats, research symbols, and working in a research lab (Jeon et al., 2008). In another study, students who participated in a program where they would meet regularly with scientists drew fewer stereotypical pieces of equipment after the program than before (Kim *et al.*, 2002).

There have been studies in Korea that have investigated students' perceptions of scientists and their work-places, as well as sources that impact student perceptions. These studies have either not focused on high school science students or they have not compared results before and after the Green Investigation program as a recommended format for green growth education. In order to develop more green education programs, the effectiveness of on-going programs should first be investigated. Thus the main objective of this study was to examine the effectiveness of the program toward constructing high school science students' images of scientists. The study used the drawing method because it is a widely acceptable tool in terms of effectiveness in order to assess students' perceptions of scientists and their work places (Chambers, 1993; White & Gunstone, 1992). The following questions were investigated:

1) What are the perceptions of scientists held by Korean science high school students? Are there any differences before and after the Green Investigation program?

2) Can the program be used as a source of constructing student images of scientists?

Ⅱ. Method

The program

The program was a specially prepared program in order to give students research experiences with scientists and every grade 11 students were required to attend because the goal of this program had been to provide students the opportunity to learn about nature. It also was meant to assist scientifically talented students in developing a better understanding of science inquiry and problem-solving. The themes of the program were: water-quality, environmental factors of tideland, elements of rocks, aquatic microorganisms and insects, plant classification, and plant adaptation to habitat. The intent was for students to improve their abilities of investigation with nature through a guided inquiry activity, as well as to recognize the value of nature's voice in regards to environmental issues.

The program consisted of two stages: Part I and Part II (Table 1). The first part was the planned stage of an investigation in the field with scientists, lasting three days. The second part comprised the later steps of the investigation including analyzing data, writing a report and attending a small conference at the school for ten days. All students participated equally in each step.

A science teacher asked several scientists in the fields of Biology, Chemistry, and Geo-science to volunteer for the program. Consequently, seven scientists and twenty teachers became involved in the program. Students were grouped according to the discipline they most wanted to investigate. All groups had teachers as assistants, but not all of them trained in science. Teachers were required to work on proposals with students and guide them on the field trip.

Table 1 The Green Investigation program details

		Activities	Content
Part I (Outdoor)	First day	Orientation	Purposes and goals of camp, introducing scientists, & safety education
		Investigation	Review of theme & investigations with scientists
			Collect data
		Key note	Toxic Algae: Taste & Smell
		Group activities	Organizing data & discussion
	Second day	Investigation	Collect & Analyze data
	Third day	Investigation	Wrap up working in the field
		Field trip	Dinosaurs museum/ Suncheon Bay Ecological Park
Part II (Indoor)	For ten days	Investigation	Writing a paper, preparing a presentation
		Conference	Making a poster of the investigation, inviting parents, and rewards for good products

Modified DAST

In order to obtain students' perceptions of scientists, Chambers' (1983) Draw-A-Scientist-Test (DAST) was used. DAST is the most common tool to assess students' images of scientists. In using DAST, students are asked to draw an image of the scientist. DAST was modified with some adaptations for this study from previous studies (Song & Kim, 1999; Joo *et al.*,2009). The modified questionnaire had two questions (Table 2). The first question was about drawing a scientist and asking students to give a brief explanation of their drawing on the four sub-questions. Adding the explanation of the drawing had two purposes. One was to help students who might possibly have difficulties drawing a scientist, because of limited drawing skills. Another was to conduct a more clear analysis from vague drawings (Song & Kim, 1999). The second question was about selecting the top three factors (out of a possible 12 choices) which may have affected their final drawn image of the scientist. Students spent about 20 minutes completing the modified DAST.

Sample

This study carried out with 64 students, grade ll Korean science high school students in a metropolitan city. There were 80 students in the school and 66 students volunteered to participate. However, only 64 students were included because two students' responses did not have names on them, making it impossible to use them for pre/post assessment. The sample contained 55 boys and 9 girls. They had been informed that participation in the study would not affect their grades.

Data Analysis

DAST-C (Draw-A-Scientist-Test-Checklist) by Finson *et al.* (1995) was modified based on suggestions from previous studies (Chambers, 1983; Joo *et al.*, 2009; Song & Kim, 1999) and cultural differences. This study used the modified DAST-C for analysis. In the modified DAST-C, there were 9 categories of analysis for this study; ① personal characteristics, ② symbols of research, ③ symbols of knowledge, ④ signs of technology, ⑤ co-work, ⑥ work place, ⑦ what a scientist is doing ⑧ gender ⑨ age. From the first category to the fourth, counts were conducted to explore how many drawings had the following items; lab coats, eyeglasses, pencils/pens in pocket, unkempt appearance, test tubes, flasks, microscopes, Bunsen burners, experimental animals, books, filing cabinets, solutions in glassware, or machines. If any items were in a drawing, but did not fit under any of these categories, it was placed in an “other” category. From the fifth to the ninth category, depicted responses of each category from students were counted.

In this study a paired-sample t-test was used. Eta squared, which is one of the most commonly used effect size statistics (Pallant,

Table 2 The structure of the questionnaire

Question	Contents	Response type
1	Drawing a scientist	Drawing
	Gender of a scientist	Alternatives
	Age of a scientist	Alternatives
	Explain what a scientist is doing	Open-ended
	Background of a drawing	Open-ended
2	Three effect factors of drawing	Alternatives

2005), was calculated for the purpose of obtaining how much the intervention affected images both of scientists and of their work places. Thirty replies were randomly selected to be analyzed by two raters. Inter-rater reliability was determined to be .81($p < .05$).

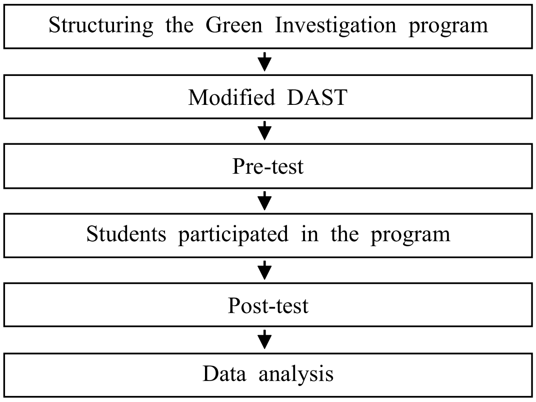


Fig. 1 Overview of the study

Ⅲ. Results and Discussion

1. Scientists' Images

Overall Images of the Scientist

Table 3 shows the result of the distribution of the items according to four cohorts of students. The first cohort consisted of 25 students who picked biology as their program. The second cohort consisted of 10 students who chose physics. The third cohort consisted of 14 students who picked chemistry. The forth cohort consisted of 15 students who picked geo-science. Students of all groups generally held images of scientists who investigate alone with lab coats, test tubes, flasks, and several machines in a lab. There was no difference of the main image of the scientist before and after the program. The main characteristics of the physical images of the scientist were similar to the results of many previous studies (Kim *et al.*,2005; Noh & Choi, 1996; Song & Kim, 1999; etc). However, comparing frequency of "lab coat" to previous studies, this item in both pretests and posttests was more popular. This seems to reflect the fact that science high school students often put lab coats on for their own classes. However, lab coats were less popular in posttests than in pretests, which may reflect the fact that scientists of the Green Program do not wear lab coats while in the field.

Many items representing stereotypical scientists were less popular in post-test compared to pre-test. Thus, a paired samples t-test was conducted. The results seek to evaluate the impact of the intervention on students' scores on the images of scientists (table 4). There was a statistically significant decrease in DAST scores from pre-test (M=13.56, SD=15.24) to post-test (M=12.13, SD=14.32, t=2.24, $p < 0.05$). The eta squared statistic (.12) indicated a large effect size. Therefore, given the eta squared value of .12, this study can conclude that there was a large effect, with a substantial difference in the item frequency obtained before and after the program.

Frequencies of all categories, except the co-working, were decreased after the program (Fig. 2). There was a statistically significant decrease in "Co-working" scores from pretest (M=1.20, SD=.41) to posttest (M=1.13, SD=.33, t=2.31), $p < 0.05$. Because a response of "Alone" was coded as 1 and "Co-work" was coded as 2 the decreasing mean of response represented that students drew scientists who were working alone.

In terms of the results from decreased categories, because the scientists did not have ordinary items in the field it seems students might have drawn the images of scientists they met during working days on the program. In terms of the result from "Alone" category, it

Table 3 Response frequencies to the modified DAST questionnaire

		Biology(N=25)		Physics(N=10)		Chemistry(N=14)		Geoscience(N=15)	
Category	Item	pre	post	pre	post	pre	post	pre	post
Personal characteristics	Laboratory coat	17	14	4	1	7	3	7	7
	Eyeglasses	4	5	2	0	1	1	1	2
	Pencils/pens in pocket	1	1	0	0	0	1	0	0
	Unkempt appearance	3	2	0	1	2	1	0	1
Symbols of Research	Test tubes	10	6	3	2	5	2	3	2
	Flasks	14	8	1	0	8	7	4	3
	Microscope	3	1	1	0	0	0	0	1
	Bunsen burner	2	1	0	0	1	0	2	0
	Experimental animals	0	1	0	0	0	0	1	2
	Warning signs	1	1	0	0	1	0	1	1
	Others	12	12	2	2	6	3	3	6
Symbols of Knowledge	Books	1	2	1	1	4	3	5	2
	Filing cabinets	0	0	0	0	1	0	0	0
	Others	0	0	2	0	2	0	3	4
Signs of Technology	Solutions in glassware	9	6	3	2	6	4	1	0
	Machines	12	8	4	5	6	4	12	8
	Others	2	1	0	0	0	0	2	2
Co-work	Alone	20	23	9	9	11	13	11	11
	More than two workers	5	2	1	1	3	1	4	4
Working place	Lab	20	12	7	5	9	8	8	10
	Field	0	5	2	2	2	2	2	3
	Auditorium	1	1	0	0	1	0	2	1
	Others	4	7	1	3	2	4	3	1
Doing	Investigation	17	18	4	5	10	9	10	10
	Public speech	1	2	0	0	1	0	2	1
	Others	7	5	6	5	3	5	3	4

*Note. N refers to the total number of students enrolled in the specific subject whereas other number refers to the frequencies of each item.

Table 4 Change of image of scientists

Pre test		Post test		t	p
M	SD	M	SD		
13.56	15.24	12.13	14.32	2.24	0.031*

* $p < 0.05$

seems to reflect students' characteristic that science high school students prefer to work alone when they do an enriched task (Kim & Choi, 2009). Students also possibly reflect the images of scientists they met during working

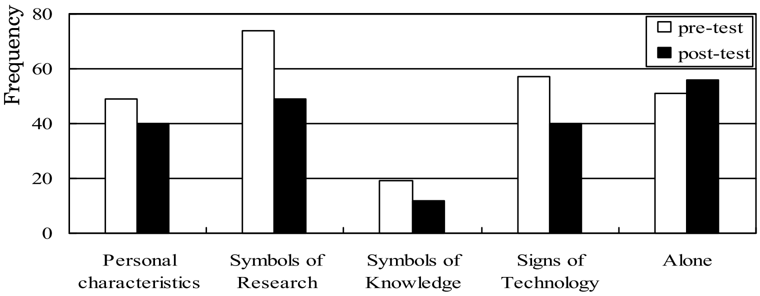


Fig. 2 Distribution respondents about categories of before and after the Green Program

days on the program because they saw the scientists did work alone in the field.

A comparison between before and after the program showed that there was no difference of scientists gender (Fig. 3). For instance, over three quarters of the students identified the scientist as male (82.8%) while only 9.38% identified them as female on the pretest. On the post-test, male scientists were depicted on 82.21% of the responses, while only 10.94% were female.

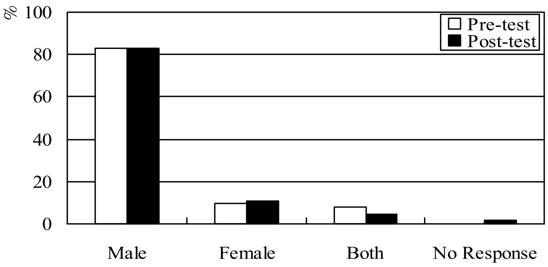


Fig. 3 Genders of the scientists

Most students thought that the age of the scientist would be either in their 20s (39.06%) or 30s (43.75%) in the pretest (Fig. 4). The ages of the scientists from the posttest were also 20s (35.93%) and 30s (35.94%). In terms of the ages of the scientists, these results are consistent with previous studies in Korea (Yeo, 1998; Song & Kim, 1999; Joo *et al.*, 2008). However the scientists described here are younger than those normally described in other studies, which are generally elderly or middle- aged (Chambers, 1983). This seems to reflect the cognitive fact that science high school students may themselves become a scientist in the near future. Indeed, students drew several scientists who looked like themselves and put friends' names on them.

Scientists' Work

The data of what the scientist did were categorized into three main groups: ① investigation, ② speech, and ③ others. Results

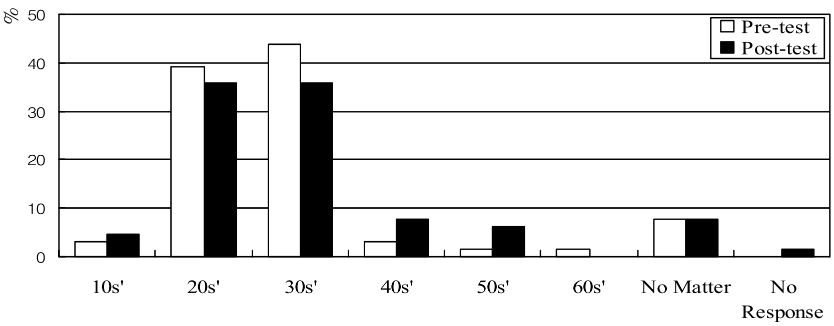


Fig. 4 Ages of the scientists

of the pretest showed an order of follows: investigation (64.06%) 〉 others (29.69%) 〉 speech (6.25%). A consistency of this pattern was represented in the posttest as follows: investigation (65.63%) 〉 others (29.69%) 〉 speech (4.68%). In details of the 'investigation' group, students slightly shifted their perceptions of scientist work from only experimenting to investigating by observations and collecting data in the field as well.

In order to obtain students images of where scientists work, a paired samples t-test was conducted to evaluate the impact of the intervention on students' scores on the images of scientists' work places (Table 5). There was a statistically significant decrease in the scores of the lab from pretest (M=1.69, SD=1.14) to posttest (M=1.96, SD=1.24, t=4.43), $p < 0.001$. The eta squared statistic (.24) indicated a large effect size.

Table 5 Change of images of scientists' work places

Pre test		Post test		T	*p*
M	SD	M	SD		
1.69	1.14	1.96	1.24	4.43	0.000**

** $p < 0.001$

In other words, the students perceived scientists as working mainly in some type of laboratory before engaging the program, but in the field as well as in the lab after the program. This finding was in line with results from the study of Kim *et al*. (2002) that as students worked with scientists their ordinary perceptions of the scientist decreased.

Students represented their changes of what scientists do through their drawings (Table 6). For example, as shown in the drawings below, three students on the pretest (R1, R2, and R3) pictured scientists wearing a lab coat, working in the lab while dealing with several apparatuses. After the program, R1 and R2 depicted the scientists wearing regular clothing as working in outdoor places such as a tideland. Because of the students' large change in perception, these are labeled as "extreme changes". Another type of change was found in the response of R3. In this post-test drawing, the scientist's physical features after the program were consistent with what was drawn before, however, R3 indicated that the scientist carried out work such as collecting data, not in the lab, but in a generic work space. This and other similar cases are labeled as "progressive changes".

Others, but non-ignorable responses

Several responses showed that science high school students possibly understood the nature of science and the nature of inquiry that were related to scientists and their work (Table 7). Regarding social influence as a nature of science, scientists cannot be independent of society and science is strongly related to political and economical issues (Seung *et al*., 2009). One student drew very negative portrayals of this aspect of nature of science. On the pretest the student had a scientist who was working hard very far away from his family. On the posttest that same scientist had committed suicide because he had made little progress in his research. Another student drew a scientist who worked hard because they were engaged in work with the government and a large company.

Students also showed that they understood aspects of scientific inquiry through their drawings. Scientific inquiry is referred to as analyzing and interpreting data and communicating the conclusions (Park, 2008). For instance, R5 drew a scientist who was analyzing data and writing papers as part of drawing conclusion. R6 represented scientists who were communicating the conclusions with

Table 6 Depicted drawings that showed students' perceptive changes of the scientists jobs & working place

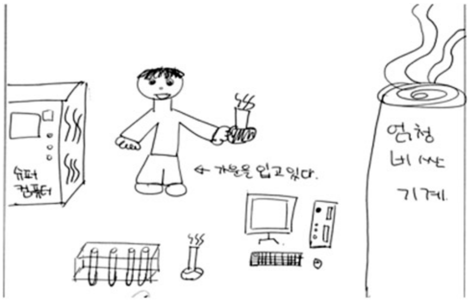
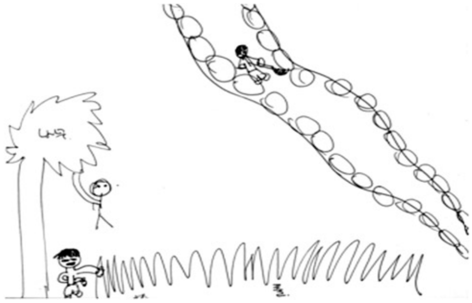
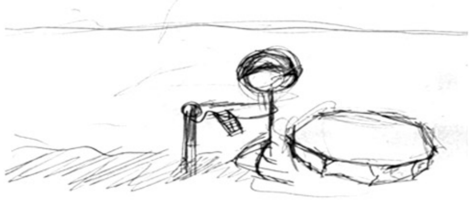
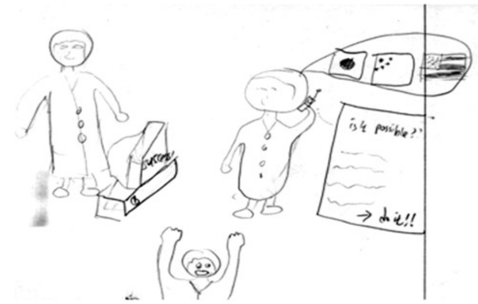
Categories		Pretest	Posttest
R1			
Scientist	Gender (Age)	Male (20s')	Male (30s')
	What & W here	Research in a lab	Sampling for a research in a field
Effectors		Science textbook/Cartoons/Internet	Green program/Visiting/Science magazines
R2			
Scientist	Gender (Age)	Male (30s')	Male (40s')
	What & Where	Research with assistants in a lab	Measuring the conditions of tideland
Effectors		Science textbook/Cartoons/Internet	Green program/Sci. textbook/Sci. magazines
R3			
Scientist	Gender (Age)	Female (20s')	Female (20s')
	What & Where	Research in a lab	Research(not in the lab, but in exploring for collecting data)
Effectors		Visiting/TV programs/Internet	Green program/Sci. magazines/Internet

Table 7 Students' responses that should be carefully treated as the scientists images

		Pretest	Posttest
R4 Nature of Science-social view			
Scientist	Gender (Age)	Male (30s')	Male (30s')
	What (Where)	Little progress in a research for months (in lab/ His house)	Suicide (in his house/Rooftop of a building)
Effect factor		Biography of scientist/Newspapers/Movies	Biography of scientist/Teachers/Movies
R5 Nature of Inquiry-analyzing data, drawing conclusions			
Scientist	Gender (Age)	Male (30s')	Male (30s')
	What (Where)	Analyzing data, writing a paper (in a lab)	Analyzing data, writing a paper (in a lab)
Effect factor		TV programs/Sci. magazines/Internet	Green program/Teachers/ Sci. magazines
R6 Nature of Inquiry-communicating conclusions			
Scientist	Gender (Age)	Male (30s')	Male (30s')
	What (Where)	After transmitting a successful product, tele-communicating with co-researchers in outside of a country (in a lab)	After transmitting a successful product, tele-communicating with co-researchers in outside of a country (in a lab)
Effect factor		Sci. magazines/Newspapers/Internet	Newspaper- TV programs-Sci. magazines

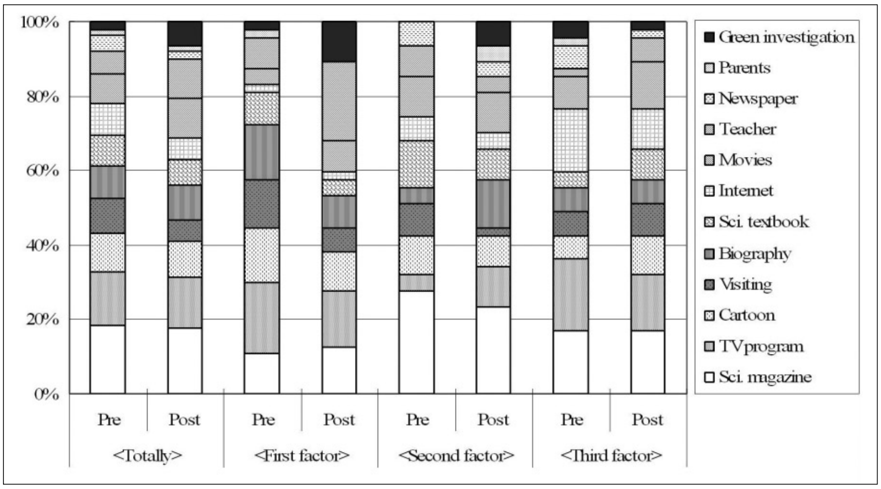


Fig. 5 The sources of the images of the scientist

co-researchers. These represent a small number of responses among all students' drawings, however, further studies should be considered to explore possible relationships between students' understandings of nature of science and inquiry and their drawings.

2. Sources of images of the scientist

Fig. 5 represents what sources effect students' perceptions of the scientist, as well as how they differed before and after the program.

Students were asked to select the three most likely influences on their drawings. In general, the most popular source of the images turned out to be science magazines, which were chosen by 18.43% of students in the pretest and 17.72% in the posttest. The second most popular source was TV programs, which was chosen by 14.18% in the pretest and 17.72% in the posttest. The third most popular one was cartoons (10.64%) in the pretest, and movies (10.64%) and teachers (10.64%) in the posttest. These findings were in line with conclusions reached in the study of Song & Kim (1999). The students' images of scientists were affected by the following: printed media 〉 visual media 〉 school education. Comparing both studies, the detailed sources were different because general high school students selected movies and cartoons as the most likely to affect their perceptions of scientists, but science high school students revealed science magazines as being most influential. It seems to reflect the fact that science high school students have more access to science magazines than high school students do.

Specifically regarding the effect of the green program, a paired samples t-test was conducted to evaluate the impact of the intervention on the sources of students' images (Table 8). There was a statistically significant increase in Green Investigation scores from pretest (M=0.02, SD=0.15) to posttest (M=0.06, SD=0.25, t=2.49, $p < 0.05$). But the eta squared statistic (.04) indicated a small effect size.

Table 8 The result of t-test for means of before and after the program

Pretest		Posttest		t	p
M	SD	M	SD		
0.02	0.15	0.06	0.25	2.49	0.014**

** $p < 0.05$

Ⅳ. Conclusions and future studies

This study investigated the perceptions about scientists held by Korean science high school students and tried to obtain the effects of a Green Investigation by comparing images from modified DASTs before the program and after it.

In the students' drawings of scientists, equipment that often represent ordinary science were frequently drawn in both tests, and laboratory settings as well as machinery were drawn often. Scientists were depicted as being in their 20s or 30s, were generally male and were most often shown working alone. After the program, the frequency of each specific type of equipment was significantly decreased. However, the total different types of equipment and the number of machines were more various than what previous studies showed. Before the program, students had the perception that scientists mainly work in labs and sometimes spoke to the public in an auditorium. Afterward, however, the students showed slightly different images of the scientists working in labs as well as in the field, and giving public speeches. Students selected science magazines and TV programs as main factors in constructing their images. Teachers were indicated as a third level factor in their perceptions. The program also affected the changes in the factors students used to draw their pictures, but with a small effect size.

The results of this study suggest that experiments in science classes handling modernized equipment should be reinforced by science curriculum in order to represent various and realistic science features. In the event of varieties and realities of scientist, students should be able to select science-related careers for their future. In fact, the students seem to be influenced by what they do in their science lab classes with various modernized scientific equipments but general high school students do not. In addition, students are influenced by self-images where students project themselves as future scientists because the students do science in their school very likely what scientists do in their labs. The finding supports the assertion from the previous study (Lee & Jeong, 2004) that experiments affect students' attitudes toward science.

It is also important recognize that the Green Investigation program affects the students' perceptions of scientists and their work. In other words, the program can help to reconstruct students' perceptions toward various images of science and scientists. Therefore, students should be encouraged to be involved in various related programs. For that, adapting programs into the formal curriculum may be an effective strategy for learning what scientists actually do in various fields (Yoon, *et al*., 2002). Furthermore, because teachers often complain that they do not have enough resources or activities embedded in the content that they are to teach, all Green Growth Education activities and instruction should be provided with details. Consequently, before ended up of revising current curricular to offer in-dept education, pilot green programs which are going to be applied to students need to be implemented to evaluate and increase realistic perceptions of scientists and their work with detailed instructions for the purpose of accurate adaptation to formal curricular.

It appears, however, that people's images of science are constructed in the early ages of life and remain strongly stable for students. Taking this view, the changes of the high school students' images need to be investigated as two whether they are temporary phenomenon and quickly regress, or not. In addition, although some students represented positive views of scientist and their works, some others had the negative relationship between a scientist and the government. Previous studies also have mentioned students' negative imagines of science as well (Kim, *et al*., 2008; Scherz & Oren, 2006). Since these students have a high possibility of becoming scientists who might lead Korea in the field of science, further studies about their understanding of the relationship between scientists and the government need to be done.

This study is the first in the Korean science education literature to investigate the influence of the Green Investigation program on science high school students' perceptions of scientist. In addition, the results of this study provide information that will help in the development of programs and improvement to perceive various scientist' images through the Green Growth Education program.

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국문 요약

이 연구는 과학고등학교 학생들이 과학자들과 함께 하는 녹색탐사활동에 참여하기 전과 참여하고 난 후에 과학자와 과학자가 일하는 곳에 대한 인식을 알아보고, 활동이 학생들의 인식에 영향을 미칠 가능성에 대해 알아보고자 수행되었다. 변형된 DAST를 이용하여 과학고등학교 1학년 64명의 학생들을 대상으로 활동에 참여하기 전과 후에 과학자의 이미지와 일하는 곳에 대해 조사하였다. 참여자들은 과학자에 대해 실험복을 입은 20-30대 남성이 시험관, 플라스크, 기계들을 있는 실험실에서 혼자 연구하는 전형적인 이미지를 가지고 있는 것으로 나타났다. 과학자의 전형적인 이미지를 나타내는 항목들과 하는 일에 대해서는 활동 전(M=1.69, SD=1.14)과 활동 후(M=1.96, SD=1.24, t=4.43, $p<0.001$)에 유의한 수준에서 차이를 보여 과학자와의 활동이 과학자와 그들이 하는 일에 대한 인식의 변화에 영향을 미칠 가능성이 있음을 시사한다고 볼 수 있다. 따라서 학생들이 과학자들과 함께하는 녹색탐사활동을 지속적으로 계발시키고 보급시킬 필요가 있다.

주요어: 녹색탐사활동, 과학자에 대한 인식, 과학자가 일하는 곳, 과학고등학교 학생