

# Unconscious Factors May Be More Important Than Conscious Factors in School Education: Development of a New Type of Prevention Education for Children's Health and Adjustment and Assessment of Its Effectiveness

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(Keywords: prevention education, school children, health, adjustment, assessment)

## **When teachers develop classes, they too often rely on their subjective experiences**

In schools, teachers develop their classes, considering how their students recognize, think, and behave in class. In this case, these cognition-related behaviors are analyzed in terms of conscious factors. That is, it is emphasized how children consciously recognize, think, and behave. Apart from governmental curriculum guidance and textbooks, when teachers develop classes by themselves, they mostly rely on their prior experiences that have been subjectively constructed through their senses. However, it is true that subjective experiences often lead to a misunderstanding of the truth. Consider how long it took for the heliocentric theory, originally advanced by Nicolaus Copernicus, to be accepted in place of the geocentric theory. Although this was partly due to problems regarding Christianity, it is one primary example where human senses were unable to directly conceptualize a phenomenon.

If teachers do not rely on their experiences, what are they able to rely on? One of the most promising sources to rely on is their knowledge, especially scientific knowledge. However, at present, at least half of people will answer negatively if they are asked whether education needs to be science-based, which is in sharp contrast with the fact that most people believe that medicine should be science-based. However, in ancient times (such as in ancient Greece), people would not have insisted that medicine needed to be based on science. What changed attitudes about medicine? An accumulated amount of scientific data and testable theories in medicine was utilized to make medicine grounded on scientific principles. When it comes to school education, many people would think that there are few theories and science-based data to utilize for the development of educational programs. If any relevant data existed, most people would claim to not know about them. It is clear that some scientific data and theories are applicable to education, but it is also clear that these materials are scarce. However, our attitude toward utilizing existing scientific data and theories as much as possible for educational development will change educational processes to be more scientific even if only a limited amount of scientific knowledge currently exists.

## **Neuroscientific investigations into the role of unconscious and conscious information processing**

In recent years, neuroscience research has entered into the domains of conscious and unconscious processes that had been beyond its scope for a long time, mainly due to methodological limitations. In particular, the development of new methods to examine brain function such as fMRI (functional Magnetic Resonance Imaging) and NIRS (Near Infrared Spectrometry) contributed to this new research, along with more detailed examinations of patients with brain damage. These findings have revealed that most human activities such as thinking are controlled unconsciously. For instance, Bargh and Chartrand (1999) suggested that 95% of behaviors are controlled unconsciously.

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In line with these findings, Damasio (1994) proposed the somatic-marker hypothesis. Here, emotions that are in most cases subtle body reactions can unconsciously determine human behaviors. In other words, if emotions are not evoked and processed appropriately, humans cannot select and execute any behaviors. In this case, emotions can be evoked not only by external stimuli, but by mental simulation as Damasio (1999, 2003) suggested in his “as if body loop” mechanism. When evoked, emotions are first unconscious or subconscious, with only some thereafter rising to the level of consciousness to partially become feelings. In general, the stronger and more emotional the content evoked, the higher the possibility that conscious emotions or feelings will arise. Feelings can be indicated by specific names such as “angry” and “happy” if a conscious spotlight is directed at them.

Thus, if humans learn appropriate psychological functions such as thinking, cognition, and behaviors, they need to learn them under the condition that sufficient emotions and feelings are evoked. Moreover, according to Greenberg (2008), this combination between emotions and higher-order psychological functions would become stronger if emotions become more conscious, although it is not essential to make emotions conscious.

In the domains of psychology and psychiatry, researchers have mainly developed scientific methods and theories to modify behaviors and cognition. Although psychoanalysts like Sigmund Freud have focused on emotional motives, their contentions were not scientific. Moreover, when we aim to educate children based on the theory that adaptive higher-order psychological functions such as thinking, cognition, and voluntary behaviors should be learned under the condition that emotions are sufficiently evoked, we found that we have almost no prior methods to establish such conditions. In other words, although we have enough scientific information regarding what to target in higher-order functions and how to modify and cultivate them, we know little about how to evoke appropriate emotions and to achieve the desirable combinations between emotions and higher-order psychological functions.

### **A new type of prevention education based on a novel theory**

From the necessity to develop educational aims in terms of the new theory described above, the Center for the Science of Prevention Education at the Naruto University of Education in Japan developed a new prevention education for children’s health and adjustment, named “TOP SELF (Trial Of Prevention School Education for Life and Friendship)” and have been implementing it in schools for the past five years. This prevention education was scientifically developed based on the science of prevention education, which aims to develop background theories, purposes, and methods, along with examining the effectiveness of the education, utilizing scientific empirical data, theories, and methodologies.

In general, when a program is considered to be science-based, it means that effectiveness is examined utilizing scientific methods. Our educational model also attempts a scientific evaluation as much as possible. However, there are two obstacles to overcome in order to complete this scientific evaluation. The first is how to develop measures to assess unconscious and subconscious status, since, as stated above, this prevention education underscores the roles of unconscious and subconscious emotions. At present, the model only measures psychological characteristics regarding the main purposes of the education using self-report questionnaires that mostly test the conscious level of participants. Although many projective and semi-projective assessments such as the Rorschach test and the P-F study have been developed, they all take a great deal of time and labor to implement in addition to having subjective scoring procedures. More objective and easier methods for implementation and scoring are needed. Therefore, we need to develop a new assessment tool to meet these needs.

### **How do we assess unconscious and subconscious status?**

In recent years, some researchers in psychology have started to measure implicit psychological characteris-

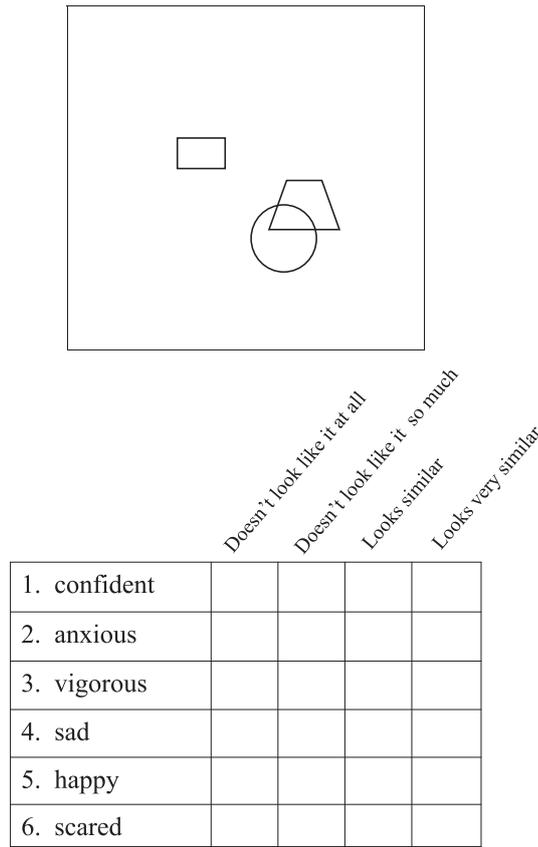
tics such as implicit affect and self-esteem. What “implicit” refers to is inconsistent between researchers. For instance, Quirin, Kazén, and Kuhl (2009) proposed that implicit affective processes can be assumed to operate basically at a preconscious level. Moreover, many studies indicate that implicit attitudes are often experienced as gut feelings or intuitive reactions (Gawronski & LeBel, 2008; Huntsinger, 2011; Huntsinger & Smith, 2009; Jordan, Whitfield, & Zeigler-Hill, 2007; Ranganath, Smith, & Nosek, 2008; Smith & Nosek, 2011). Thus, it is likely that implicit psychological characteristics are largely preconscious. Although it is assumed that the levels of unconsciousness vary, from deep to shallow, implicit characteristics are likely to be located at a relatively shallow level near consciousness.

Although there are a number of tools to assess implicit characteristics, Quirin et al. (2009) developed a questionnaire named the Implicit Positive and Negative Affect Test (IPANAT) to assess implicit positive and negative affect. Fig. 1 illustrates two (artificial words plus emotion adjectives) of the six items in the IPANAT. Since prevention education such as TOP SELF underscores the roles of unconscious emotional functions, scales such as the IPANAT are essential to examine how effectively emotions work in educational processes. Additionally, unlike prior projective assessment tools, the IPANAT is easy to implement and score with high reliability and validity. However, the IPANAT is a scale for adults, so we need to utilize a version for children, since our particular interest is how children change following prevention educational programs like TOP SELF.

|       |           | Doesn't<br>fit at all | Fits<br>somewhat | Fits<br>quite well | Fits<br>very well |
|-------|-----------|-----------------------|------------------|--------------------|-------------------|
| SAFME | happy     | ①                     | ②                | ③                  | ④                 |
|       | helpless  | ①                     | ②                | ③                  | ④                 |
|       | energetic | ①                     | ②                | ③                  | ④                 |
|       | tense     | ①                     | ②                | ③                  | ④                 |
|       | cheerful  | ①                     | ②                | ③                  | ④                 |
|       |           |                       | .                |                    |                   |
|       |           |                       | .                |                    |                   |
| SUKOV | happy     | ①                     | ②                | ③                  | ④                 |
|       | helpless  | ①                     | ②                | ③                  | ④                 |
|       | energetic | ①                     | ②                | ③                  | ④                 |
|       | tense     | ①                     | ②                | ③                  | ④                 |
|       | cheerful  | ①                     | ②                | ③                  | ④                 |

**Fig. 1. Paper and pencil version of the Implicit Positive and Negative Affect Test (IPANAT). Adapted from Quirin, Kazén, & Kuhl (2009).**

In line with this requirement, Uchida, Fukuda, and Yamasaki (2014) developed the Implicit Positive and Negative Affect Test for Children (IPANAT-C). Although the IPANAT-C is similar to the original IPANAT, it employs a number of different methods. For instance, it utilizes line drawings instead of non-sense syllables from the IPANAT, since drawings are more suitable and easier to judge for children. Also, adjectives for positive and negative affect are replaced by new words based on the Positive and Negative Affect Schedule for Children (Yamasaki, Katsuma, & Nishida, 2006). Thus, unlike the original IPANAT, the IPANAT-C contains three line drawings, each of which includes three adjectives for positive (confident, vigorous, and happy) and negative (anxious, sad, and scared) affect (see Fig. 2). Four-point Likert-type scales ranging from 1 (‘Doesn’t look like it at all’) to 4 (‘Looks very similar’) are employed for answering.



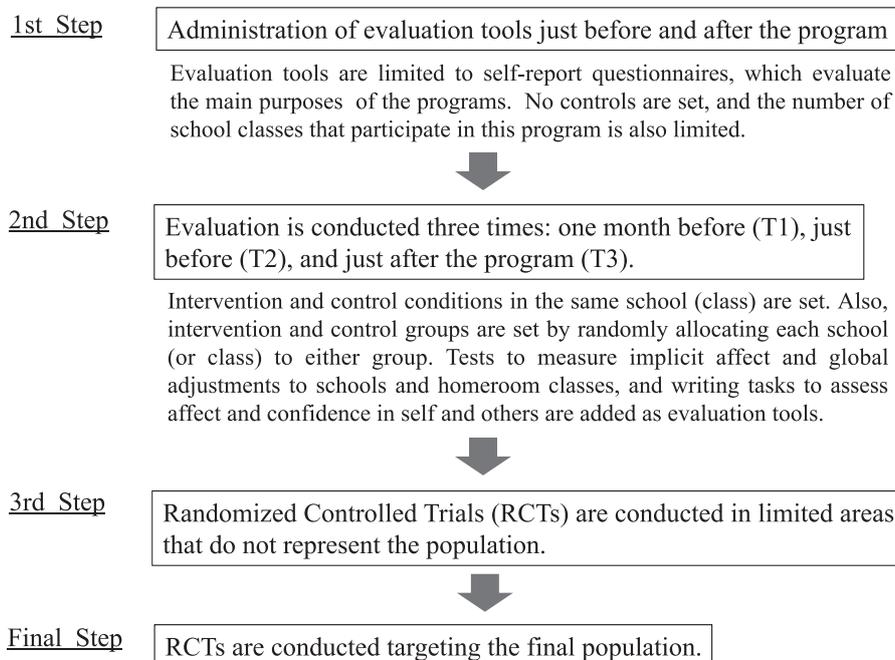
**Fig. 2. An example of the line drawings and answer sheets in the Implicit Positive and Negative Affect Test for Children (IPANAT-C).**

Another method to examine unconscious processes in children is now being developed. This method attempts to analyze the contents of writing tasks by children in terms of positive and negative affect, in addition to self-confidence and confidence in others. Children are asked to write about themselves and their best friends for four minutes each. For analysis, a text-mining software, TTM (Tiny TextMiner; Matsumura & Miura, 2009) is utilized. Unfortunately, it is difficult to objectively determine and quantify the words and expressions representing affect and confidence in oneself and others. At present, such difficulties are delaying the completion of this method. Nevertheless, analyzing written sentences is essential for several reasons. The first reason is that in writing, children naturally and unconsciously express their affect and confidence in themselves and others. The second reason is that writing is familiar to children and easy to conduct at schools because teachers often give them writing tasks in their classes. Although it has not been fully developed, the first version of a writing task has been applied to test the effects of the education. More concretely, in the task, children first write about themselves such that people who read their writings can understand who they are. They freely write about what they like, are doing, are good at, are making efforts to do, etc., within a 70-character limit over four minutes. Thereafter, and in a similar fashion, they write about one of their best friends. In the analyses, utilizing TTM, the number of words and expressions representing positive and negative affect or emotions, as well as self-confidence and confidence in others, are counted. Raw counting scores and percentages of the counts per the total number of written characters are calculated.

## Routes to the scientific evaluation of the effectiveness of education

For evaluations to be scientific, designs to examine the effectiveness of education need to be scientific while reliable and valid assessment tools are critical. At present, Randomized Controlled Trials (RCTs) are the best scientific method to test the effectiveness of educational programs. However, faultless execution of RCTs is difficult because they require many complicated conditions and procedures (cf., Task force on evidence-based interventions in school psychology, 2003) such that equanimity between intervention and control groups is attained, making the selected groups represent the targeted population. The execution of RCTs requires a great amount of cost, labor, and time. Therefore, if we plan to conduct RCTs in the future, we need to prepare for them systematically. This preparation includes completing both the education and the evaluation. Particularly, large-scale educational programs would need to follow this deliberate route to RCTs.

Consequently, we are now approaching the final RCTs on a systematic basis (see Fig. 3). The first step is the administration of evaluation tools just before and after the education. The tools are limited to self-report questionnaires to assess the main purposes of the education, along with limited school classes for implementation of the education. In the second step, the evaluation is conducted three times, one month before, just before, and just after the education. Moreover, tests to measure implicit affect and global adjustments to schools and homerooms, in addition to writing tasks to assess affect and confidence in self and others, are added as evaluation tools. In this design, we set intervention and control conditions in the same school, although we admit a limitation is that control conditions are ahead of intervention conditions in time. Also, we set intervention and control groups by allocating each school to either group by lot. At present, no waiting-list control groups are set. Thereafter, our final step before RCTs would be the execution of RCT-like trials that are different from true RCTs in that they are conducted in the samples of limited areas instead of the samples representing the targeted whole population.



**Fig. 3. Four steps of evaluation towards the final Randomized Controlled Trials (RCTs) in the TOP SELF.**

## Future directions

Aside from the aim of this prevention education to protect children's health and adjustment, another final aim is for the education to be disseminated nationwide. However, this will be difficult because the system of education in Japan is firmly controlled by our government. This means that if the education is included in the government curriculum guidance, it would be conducted nationwide, but this education aims to take bottom-up approaches instead of top-down ones because we believe that unless new education is admitted and supported by school teachers, it will not take root in schools. Once new education is included in the government curriculum guidance, it is not excluded so easily, which unfortunately means that it will continue even if its effectiveness is limited.

It is said that Japan is a country that spares cost for education. The budget per the GNP is the lowest among the developed countries in the OECD. Under the present work conditions, teachers are too busy with various chores to focus their work on education itself, while seemingly ineffective and meaningless curriculums are continuing without any scientific evaluation. Now is the time we should reconsider what is really needed for our school children.

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## Abstract:

This paper describes a new type of prevention education for children's health and adjustment. Unlike prior programs, this prevention education is based on scientific data and focuses on the roles of unconscious factors and emotions, which are mostly unconscious subtle body reactions. Thus, this education evokes emotions that partially become feelings after emotions rise up to the conscious level, and under the condition that emotions and feelings are sufficiently evoked, adaptive mental characteristics such as thinking, cognizing, and behaving are learned. Thereafter, these learned mental characteristics with evoked emotions and feelings are stored into memories. Thus, when children encounter a situation similar to the one they learned about in class, their mental characteristics, guided by memorized emotions and feelings, work adaptively in real life. Moreover, this paper depicts the methods of assessment for the described prevention education. Although Randomized Controlled Trials (RCTs) represent the final planned assessment, we are currently preparing for this step, and are now conducting preliminary methods of assessment. At present, we have developed a number of tests to assess implicit features of learning in children using semi-projection methods and writing tasks. Further, we have set up control conditions or groups to compare against intervention conditions or groups, although such conditions and groups have limitations. Finally, future directions for this education to be implemented widely on a regular basis are discussed.

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