

Running head:

EXCESSIVE SELF-ESTEEM MAY BE HARMFUL

Original Research Article

Excessive Implicit Self-Esteem May Harm Scholastic Performance of Girls:

A Survey Report on Japanese Junior High School Students

(2,886 words, excluding the title, abstract, and references)

Akitoshi UCHIDA¹⁾ & Kazuo MORI²⁾

¹⁾ Graduate School of Professional Educational Studies, Oita University,

²⁾ Tokyo University of Agriculture and Technology

Correspondence should be sent to:

Professor Akitoshi UCHIDA

Oita University, 700 Dannoharu, Oita City 870-1192, JAPAN

a-uchida@oita-u.ac.jp

Acknowledgments

This study was supported by Grants-in-Aid from the Japan Society for the Promotion of Science (Grants 22K02235) to AU. We obtained the informed consent of the principal and vice-principal of the junior high school before conducting this survey. We wish to express our thanks to the students and teachers who participated in and supported this research project.

Conflict of interest statement

The authors declare that there are no conflicts of interest regarding the publication of this study.

Data availability statement

The original data are available at the following site:

https://researchmap.jp/multidatabases/multidatabase_contents/download/230813/9ceb2e156dfb66626a2068e497dc9791/21552?col_no=2&frame_id=575977

Excessive Implicit Self-Esteem May Harm Scholastic Performance of Girls:

A Survey Report on Japanese Junior High School Students

Abstract

Objectives: We aimed to probe whether 1) self-esteem levels would predict later academic performance and 2) the relations between self-esteem and test scores would show gender differences. **Method:** We assessed the self-esteem of 158 students (81 boys and 77 girls) in the 7th grade of a Japanese junior high school with a group-performance IAT (implicit measure) and a questionnaire (explicit measure). We classified the students by their self-esteem levels and analyzed the longitudinal changes in their standardized academic scores (Z-scores) throughout the first year. **Results:** Girls performed better than boys in the term examinations in general. The boys and girls with higher explicit self-esteem showed superior academic performance. The relationships between the implicit self-esteem levels and academic scores showed different patterns. Boys and girls with excessively positive implicit self-esteem showed the opposite longitudinal changes in their academic performances; the former improved while the latter lowered their test scores. (148 words)

Keywords:

implicit self-esteem, paper-and-pencil IAT, junior high school students

1. Introduction

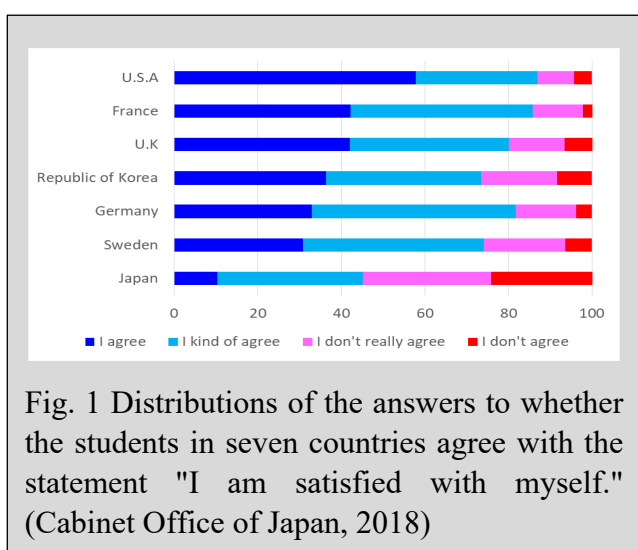
It has been known that self-esteem matters in school life of students to researchers with scientific studies and surveys, as well as schoolteachers with everyday teaching practices. Students with high self-esteem are doing well in general in school. Their scholastic performances are superior to those with low self-esteem. Students with high self-esteem are better adjusted to school life, not only in terms of grades, but also in various aspects of school life than those with low self-esteem.

Meanwhile, the international survey recently conducted by the Japanese Cabinet Office showed that the self-esteem levels of Japanese students were lower than those of other six countries, including the US, the UK, and Korea. (Figure 1; Cabinet Office of Japan, 2018). By considering the results of other international assessment surveys on scholastic achievements, such as PISA (Schleicher, 2019) and TIMSS (Matsuura & Nakamura, 2021), in which Japanese students performed better than students from the other countries, it is curious that Japanese children showed lower self-esteem than the other nations.

It has long been pointed out that questionnaire surveys are not suitable for measuring social attitudes because respondents can lie to the questions (Greenwald & Banaji, 1995). Then, Greenwald and colleagues developed an alternative assessment measure, Implicit Association Test, for social attitude research such as racial discrimination (Greenwald, McGhee, & Schwartz, 1998).

The IAT would be suitable for assessing self-esteem by avoiding the conscious or unconscious biases in questionnaires. However, the IAT is not easily administered in schools because it needs a personal computer for each student. Therefore, Mori, Uchida, and Imada (2008) revised the administration procedure of the IAT so that a schoolteacher can efficiently conduct it similarly to questionnaires. They adopted the basic idea of the IAT and made a paper-and-pencil version (the “FUMIE Test”). The FUMIE Test can be administered in a group in less than five minutes. Therefore, it can be used along with a conventional questionnaire.

Uchida and Mori (2018) found a similar phenomenon in Japanese junior high school students concerning mathematics learning. They showed superior performance on an international assessment of mathematics while they tended to answer that they disliked mathematics. Uchida and Mori suspected that the Japanese students disguised their attitudes toward mathematics in questionnaires. Then, they administered the FUMIE Test along with a conventional questionnaire to Japanese junior high school students and found



that about 20 percent of the students showed a positive attitude implicitly while they answered negatively in a questionnaire. They named those students "fake math-dislikes."

In their pilot study, Uchida and Mori (2020) took the same approach to this issue. They administered a FUMIE Test to assess the implicit self-esteem of Japanese students, along with a conventional questionnaire, and found that Japanese students seemed to hide their self-esteem. Namely, they answered having little self-esteem on questionnaires but performed positively on the FUMIE Test. Therefore, it would suggest the presence of "fake low self-esteem" students.

However, the Uchida and Mori (2020) study alone could not tell which of the two measures, conventional explicit self-esteem ratings or implicit one assessed with the FUMIE Test, showed the reality. The present study aimed to examine this question by investigating the relationships of the two measures with students' academic performance. In other words, we would compare the degrees of relatedness of the two self-esteem measures, explicit and implicit ones, with their academic achievement scores. The self-esteem literature demonstrated the relationship between (explicit) self-esteem and academic achievement. Meanwhile, Japanese students may not show the same relationship. Instead, the degrees of self-esteem assessed implicitly would reveal the same tendency. If so, we can judge that implicit self-esteem shows the reality more than the conventional self-esteem assessed with a questionnaire.

The present study aimed to examine the relationships between the academic performance and the two measures of self-esteem, explicit and implicit, of Japanese junior high school students. More precisely, we tried to probe the following two research

questions. 1) The implicit/explicit self-esteem levels at the start of junior high school (7th grade) may predict later academic performance. And, 2) the relations of implicit/explicit self-esteem levels between academic performance may show gender differences.

2. Method

2.1 Research design

The present study was a one-year longitudinal assessment design of a sample of Japanese junior high school students. The dependent variable was their scholastic achievement scores assessed five times during the first year (the 7th grade). At the beginning of the school year, we assessed the students' self-esteem levels in two ways, explicit and implicit. First, we classified them into high and low self-esteem groups independently for both measures. We introduced another between-participant variable: gender. Then, we followed how the achievement scores of each group would change differently over the school year.

2.2 Participants

One hundred and fifty-eight 7th grade students (81 boys and 77 girls) in Nagano, Japan, participated in the present study. Nagano City is the prefectural capital of Nagano Prefecture, located about 200 kilometers north of Tokyo. The school was a municipal public school with a middle-class range of families' socio-economic statuses. All the students were Japanese natives. We did not calculate a suitable sample size for this study

but used the whole 7th grade students of the school as a sample. We did not take a random-sampling procedure, but we regarded the sample represented typical Japanese junior high school students.

2.3 Assessment of self-esteem

a) Implicit assessment: the FUMIE Test

We used the FUMIE Test (Mori et al., 2008) to assess the implicit self-esteem of the students. The FUMIE Test consists of a series of word evaluation tasks and the target words to be assessed for the implicit associative value. In the A3-sized test sheet, words with positive or negative meanings are printed randomly on lines. The fundamental task is to classify each word "good" or "bad" by marking it with a circle or a cross, respectively, which is the standard marking procedure in Japan. It should take 20 seconds for each line. The target concept (e.g., "myself") is randomly interspersed repeatedly among the evaluation words every two other words. The examinees are instructed to mark the target words with a circle on even lines (the positive task) and a cross on odd lines (the negative task). The rationale of the test is that if an examinee has a positive implicit attitude toward the target, it is easier to mark it with a circle rather than with a cross and vice versa. Accordingly, the examinee would perform the positive task more quickly than the negative task. Thus, the difference in performance between the positive and negative tasks indicates the examinee's implicit attitude toward the target.

We assembled a 15-line FUMIE Test sheet with the target word "myself" to measure implicit attitude toward the self for the present study. Of the 15 lines, the first line was a practice task without any target word. Then, the following lines, second–7th, contained the target concept. We asked the students to mark the target word as a good one in the even lines and as a bad one in the odd lines. The remaining lines were not used, eliminating the final effort effect by ending in the mid-way.

b) Explicit assessment: Questionnaires

We prepared a 10-item questionnaire containing the self-esteem assessment question on a single sheet. In the questionnaire, the students rated on a four-point scale how much agreeing with the statement, “I think I have more good qualities than others.” The crucial question item was placed in the eighth among the other filler items.

2.4 Assessment Procedure

One of the authors, a junior high mathematics teacher at that time, administered the FUMIE Test and the questionnaire, allocating about ten minutes during his class time in April, just after the start of the academic year. The administration procedure was as follows.

- 1) Following the standard informed-and-consent procedure, the experimenter handed out the FUMIE Test sheet to the students.
- 2) He gave the general instructions: "Evaluate the meaning of each word as quickly as possible by marking with either a circle or a cross. Perform line by line with the

start cue and stop at the stop signal. Finally, in relation to the target words, mark them with either a circle or a cross, irrespective of the meaning as instructed for each line."

3) He began the marking task procedure from the first to the 7th lines, measuring 20 seconds for each line. As for the first line, he told the students it was an example trial. He gave the start cue, timed for 20 seconds, and gave the stop cue.

4) Then, for the second line, the positive task, he instructed to mark the word "myself" with a circle throughout the line. The same cues and timing were used for the second line.

5) As for the third line, the negative task, he instructed to mark the target word "myself" with a cross irrespective of the meaning of the word. Then, the same cues and timing were given for the third line.

6) Then, the positive and negative tasks were repeated twice in the same order for the 4-7th lines with the same cuing procedure.

The questionnaire administration followed immediately after collecting the FUMIE Test sheets. The experimenter handed a questionnaire sheet and instructed to answer the questions in it.

2.5 Academic achievement scores

We obtained the standardized academic scores of the students anonymized from the participants' school. Students' academic performance was assessed with the standard

term examinations administered five times during the academic year; May, July, October, November, and February. (Please note that the school year starts in April and ends in March in Japan.) The term examinations consisted of achievement tests in five school subjects, the Japanese language, social studies, mathematics, sciences, and English. In most Japanese schools, the raw scores are summed up and converted into standardized scores, Z scores with a mean of 50 and a standard deviation of 10. We used the Z scores for the five examinations for the present study.

3. Results

3.1 Grouping of students

a) Based on IAQ100 scores: Implicit Self-Esteem

First, we counted the total words marked in even lines (WP; words marked for the positive tasks) and in odd lines (WN; words marked for the negative tasks). Then, the implicit indices, the Implicit Association Quotients (IAQ₁₀₀), were calculated with the formula: $IAQ_{100} = 100 \times (WP - WN) / (WP + WN)$.

The IAQ₁₀₀ index represents the difference in the number of words marked under the two conditions per 100 words. A positive/negative IAQ₁₀₀ denotes a positive/negative implicit attitude toward the target concept, "myself." Thus, the IAQ₁₀₀ index was regarded as an implicit self-esteem index.

We classified the students into Positive Implicit Self-Esteem group ($+1.0 \leq \text{IAQ}_{100}$) and Negative Implicit Self-Esteem group ($\text{IAQ}_{100} \leq -1.0$) according to their IAQ_{100} scores, separately for boys and girls. The students with excessively high or low IAQ_{100} were excluded

Table 1
Groups with Three Implicit Self-Esteem Levels

Group	Boys	Girls	Total
Strongly Positive (iSPSE)	24	17	41
Positive (iPSE)	35	34	69
Negative (iNSE)	13	13	26
Total	72	64	136

Table 2
Groups with Three Explicit Self-Esteem Levels

Group	Boys	Girls	Total
High Self-Esteem (eHSE)	45	37	82
Low Self-Esteem (eLSE)	27	27	54
Total	72	64	136

first. Then, the students with the IAQ_{100} around zero ($-1.0 < \text{IAQ}_{100} < +1.0$) were also eliminated from the analyses. We divided further the Positive Implicit Self-Esteem students into two sub-groups; Strongly Positive Implicit Self-Esteem group (iSPSE: $M + 0.67\text{SD} < \text{IAQ}_{100}$) and Positive Implicit Self-Esteem group (iPSE: $+1.0 \leq \text{IAQ}_{100} \leq M + 0.67\text{SD}$). As the results, we had six sub-groups as shown in Table 1.

b) Based on questionnaire ratings: Explicit Self-Esteem

The students rated on a four-point scale how much agreeing with the statement, “I think I have more good qualities than others.” We classified them into the following two groups for each gender: High Self-Esteem group (eHSE) = Agree, Somewhat agree, and

Low Self-Esteem group (eLSE) = Disagree, somewhat disagree. Accordingly, we had four sub-groups, as shown in Table 2.

3.2 Average Scholastic Scores of Student Groups with Defferent Self-Esteem Levels

Figure 2 shows the changes in the average Z scores of the different self-esteem levels, separately for boys and girls; the left panel for implicit self-esteem and the right for explicit self-esteem. (Please note that the average Z score is 50, and the SD is 10.)

a) Explicit Self-Esteem and Scholastic Performances

We analyzed the simpler explicit self-esteem results first. As shown in the right panel of Figure 2, the average Z scores of the high self-esteem groups (HSE_boy and HSE_girl) were higher than those of the low self-esteem groups (LSE_boy and LSE_girl). The data also showed that girls were doing better than boys in general. The fact that students with higher self-esteem are adapted to school life more than those with lower

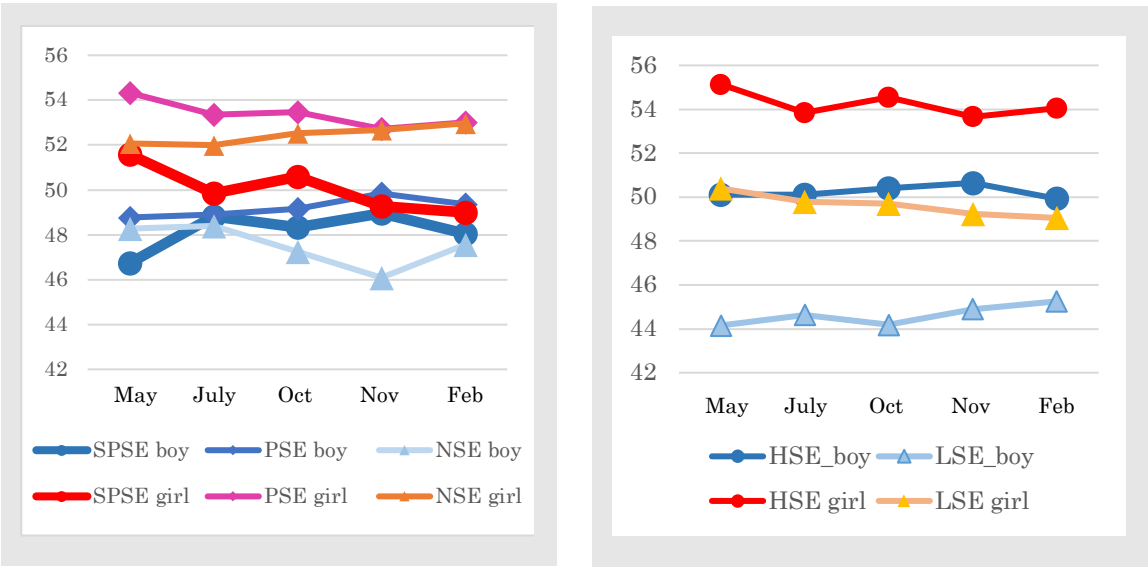


Fig. 2 Average Test Scores (Z scores) of Students with Different Self-Esteem Gruops: Implicit Self-Esteem (left), Explicit Self-Esteem (right)

self-esteem has been repeatedly reported in the previous self-esteem studies. The present study added another example.

Meanwhile, Figure 2 (right) also shows that the average scores of all the four groups were stable throughout the academic year. The students with high self-esteem at the start of junior school life performed well from the beginning and remained in a high position. The same was true for those with low self-esteem; they were lower throughout the year. In this sense, we can conclude that the explicit self-esteem levels may predict students' later performance.

b) Implicit Self-Esteem and Scholastic Performances

The relationships between implicit self-esteem and academic performance were more complicated and messy, as shown in the left panel of Figure 2. In addition, there found some contradicting tendencies with the (explicit) self-esteem literature.

First, there was no clear positive relationship between implicit self-esteem and academic performance for boys and girls. As for the boys' results, the three groups with different implicit self-esteem levels depicted similar patterns, except for the November examination of the negative self-esteem group (NSE_boy). Also, the boys with Strongly Positive Self-Esteem seemed to improve their scores.

The girls' results were contradictory; the girls with strongly positive self-esteem performed lowest among the three girls' groups, though better than any of the boys' groups, and worse later. The girls with positive (but not strongly positive) self-esteem (PSE_girl)

got the highest average score at the first examination in May but fell gradually and ended up with almost the same scores as those with negative self-esteem (NSE_girl) the following February. These two girls' groups showed similar patterns as the three boys' groups did. But, then, it was only the strongly positive self-esteem girls who performed differently through the first year of junior high school. Their scores seem to decline gradually over the five test periods.

3.3 Statistic Analyses of Groups with Different Self-Esteem Levels

To examine the statistical significance of these phenomena, we conducted a 2 (Gender) x 3 (Implicit Self-Esteem Level) x 2 (Explicit Self-Esteem Level) x 5 (Test Period) analysis of variance in academic achievement scores (Table 3). The results showed that two main effects, Gender and Self-Esteem Level, were significant ($F_{(1, 124)} = 4.713, p = .0318$, and $F_{(1, 124)} = 6.816, p = .0101$, respectively). The main effect of the test period was not significant ($F_{(4, 496)} = .288, p = .8857, ns$). These results clearly appear in Figure 2, especially in the right panel.

As for the interactions, only the Gender x implicit Self-Esteem x Test Period interaction was highly significant ($F_{(8, 496)} = 3.926, p = .0002$). Further analyses revealed that the following three sub-groups performed characteristically during the year. First, as shown in Figure 2 (Left), the girls with excessively positive implicit self-esteem lowered their scores during the year (51.673, 49.905, 50.648, 49.334, and 49.083). Their scores in

Table 3
ANOVA on Test Scores of the Boys and Girls with High vs Low Self-Esteem

S.V	SS	df	MS	F
Gender	2819.5128	1	2819.5128	6.33 *
ExplicitSE	4823.7234	1	4823.7234	10.83 **
Gender x SE	115.1458	1	115.1458	0.26 ns
Participants	58817.8948	132	445.5901	
TestPeriod	6.0441	4	1.5110	0.24 ns
SE x Test	9.6113	4	2.4028	0.39 ns
Gender x Test	96.5067	4	24.1267	3.87 **
G x SE x Test	23.3719	4	5.8430	0.94 ns
P x Test	3290.8722	528	6.2327	
Total	70002.6829	679	+p<.10 *p<.05 **p<.01	

the first examination in May went down significantly in the last two examinations in November and February.

Meanwhile, the boys with excessively positive implicit self-esteem showed the opposite pattern, improving from the lowest score (45.441) in May to statistically higher scores in the four periods (47.858, 47.112, 48.064, and 47.359). In contrast, the boys with negative implicit self-esteem got higher scores in the first two periods and lower scores after that (48.144, 48.283, 46.997, 45.821, and 47.385).

4. Discussion

Since the present study was a pilot study aiming to probe the possible relationship between students' self-esteem, assessed explicitly and implicitly, and academic performance in Japanese junior high school students, we refrain from concluding remarks

here. Nevertheless, we obtained similar results to the former studies on self-esteem assessed with a questionnaire, i.e., explicit self-esteem. Students with high explicit self-esteem were better in academic examinations in general, and those with low self-esteem performed worse than the former. We also found that both student groups maintained their academic status.

Meanwhile, student groups with different implicit self-esteem levels changed their academic ranks during the year. We found that girls with excessively positive implicit self-esteem at the start of their junior high school life may struggle with their later performance. On the contrary, boys' strongly positive implicit self-esteem raised their scores. Meanwhile, the boys with negative implicit self-esteem lowered their scores. Unlike explicit self-esteem, implicitly assessed self-esteem may predict students' future performance in school.

We need to be cautious about interpreting these results because the students who raised their scores got lower scores initially, while those who lowered their scores got high scores first. Then, the gradual changes in test scores may result from a mere regression. The sample size of the present study was not sufficient for decisive conclusions. Therefore, we will continue to accumulate the data for a larger sample. Meanwhile, it is also important to conduct follow-up data collections of the academic performances of the present cohort during the second and third years.

References

- Cabinet Office of Japan (2018). International Survey of Youth Attitude, https://www8.cao.go.jp/youth/english/survey/2018/pdf_index.html
- Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review*, 102, 4-27. doi: 10.1037//0033-295X.102.1.4
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. K. L. (1998). Measuring individual difference in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, 74, 1464-1480.
- Matsuura, T., & Nakamura, D. (2021). Trends in stem/steam Education and Students' Perceptions in Japan. *Asia-Pacific Science Education*, 1(aop), 1-27.
- Mori, K., Uchida, A., & Imada, R. (2008). A Paper-format group performance test for measuring the implicit association of target concepts. *Behavior Research Methods*, 40, 546-555.
- Schleicher, A. (2019). *PISA 2018: Insights and Interpretations*. OECD Publishing.
- Uchida, A., & Mori, K. (2018). Detection and Treatment of Fake Math-Dislikes among Japanese Junior High School Students. *International Journal of Science and Mathematics Education*, 16(6), 1115-1126.

Uchida, A., & Mori, K. (2020). Disguising self-esteem caused changes in academic achievements differently for boys and girls in Japanese junior high school. *Proceedings for the 42nd Annual Meeting of the Cognitive Science Society*, 3534.