Journal of Abnormal Psychology
1982, Vol. 91, No. 5, 343-349

0021-843X/82/9105-0343$00.75

Effects of Subliminal Oneness Stimuli in Hebrew on Academic Performance of Israeli High School Students: Further Evidence on the Adaptation-Enhancing Effects of Symbiotic Fantasies in Another Culture Using Another Language

Sima Ariam and Jerome Siller
Department of Educational Psychology
New York University

The relation between unconscious symbiotic fantasies (the experience of partial merging of self and object representation) and adaptive behavior (mathematics improvement) in a non-English-speaking culture (Israel) was studied in an attempt to determine both the replicability of previous findings and its status as a more general human phenomenon rather than as an artifact of a particular language or culture. Following Silverman's procedures, 10th-grade students in 4 groups of 18 each (matched for sex, mathematics class, and previous math grades) were tachistoscopically presented with subliminal exposures of one of four Hebrew translations of verbal stimuli: MOMMY AND I ARE ONE (two versions); MY TEACHER AND I ARE ONE; and a neutral stimulus, PEOPLE ARE WALKING IN THE STREET. Each subject received subliminal stimulation four times a week, over a period of 6 weeks. Achievement tests administered 6 weeks apart showed that groups exposed to either version of MOMMY AND I ARE ONE exhibited significantly higher scores than either of the other groups, who in turn did not differ from each other. Neither version of MOMMY AND I ARE ONE was superior to the other. The results are seen as lending support to the hypothesis that the adaptation-enhancing effect of the symbiotic fantasy represents a general human phenomenon.

The presence of unconscious libidinal and aggressive fantasies and their importance for human functioning has been a cornerstone of psychoanalytic thinking since its very inception. Programmatic work initiated by Silverman (1976, 1982b) has been directed toward investigating various hypothesized relations between unconscious fantasies and behavior. Central to Silverman's approach has been the development of a technique called "subliminal psychodynamic activation," which involves (under double-blind conditions) the 4-msec tachistoscopic presentation of stimuli designed to activate fantasies related to sexual and aggressive drives, and neutral control stimuli.[1] The following formulation has been posited by Silverman and Candell (1970):

> When a drive related stimulus registers subliminally it makes contact with whatever congruent drive derivatives are active in the individual at the time. Then, depending on the specific content of the stimulus, an unconscious conflict can be stimulated leading to an intensification of pathology, or can be momentarily "resolved" resulting in an abatement. The specific outcome obtained thus can elucidate the dynamic conditions underlying the pathology under consideration. (p. 388)

In the course of the past 15 years, there have been over 50 studies carried out in a variety of laboratories demonstrating that subliminally presented fantasy-activating

This study was carried out as a doctoral dissertation by the first author under the second author's sponsorship. Thanks are extended by the authors to Lloyd Silverman for his many criticisms and suggestions.

Requests for reprints should be sent to Sima Ariam, 160 West End Avenue, New York, New York 10023.

[1] There is a long history of studies investigating subliminal perception. Earlier studies (see summary in Dixon, 1971) focused on whether, and under what circumstances, stimuli registering below the threshold of conscious awareness could "emerge" in subjects' subsequent associations and images. Silverman, on the other hand, rather than being interested in the "recovery" of subliminal stimuli, has investigated the effects of subliminal stimuli with libidinal and aggressive content on psychodynamic processes.

stimuli can affect behavior in ways that subliminally presented neutral control stimuli cannot (summarized in Silverman, 1982b). Moreover, in several of these studies the supraliminal (10 sec) presentation of the same fantasy stimuli has not had this effect. This is consistent with psychoanalytic theory that maintains that the effects of libidinal and aggressive fantasies on behavior can be dissipated if these fantasies are made conscious.

As work with subliminal psychodynamic activation procedures has progressed, increasing attention has been paid to activating unconscious fantasies that will have adaptive rather than maladaptive effects. The initial work utilizing this method entailed activating fantasies that were designed to increase conflict and thereby intensify pathology. The key idea in the more recent work resides in the hypothesis that there can be adaptive consequences in the activation of a fantasy of "symbiotic gratification," that is, a fantasy of "oneness" with the "good mother of infancy." A number of studies have been conducted using as the subliminal stimulus to be presented tachistoscopically the phrase MOMMY AND I ARE ONE. The ability of this stimulus to promote adaptive behavior has been reported in a number of studies with schizophrenics (e.g., Fribourg, 1981; Mendelsohn, 1981), nonschizophrenic clinical populations (e.g., Palmatier & Bornstein, 1980; Silverman, Kwawer, Wolitzky, & Coron, 1973), and college-student populations (e.g., Linehan & O'Toole, 1982; Parker, 1982).

In the study most directly related to the present one, Parker (1982) followed the theorizing of Rose (1972) and Silverman, Lachmann, & Milich (in press), who maintained that symbiotic gratifications can have adaptation-enhancing effects on normal as well as clinical populations. Parker studied the symbiotic-fantasy effect on unselected college students. Students in a business-law class were divided into three groups (matched for grade point average), each receiving four times a week a different subliminal stimulus—MOMMY AND I ARE ONE, MY PROF AND I ARE ONE, and PEOPLE ARE WALKING—under double-blind conditions. On their final exams (blindly marked) the average grades were 90.4, 88.4, and 82.7 for the three groups, respectively; the MOMMY and the PROF groups were not significantly different from each other, but each of these did significantly better than the control group. Because of its potential importance for the understanding of unconscious motivation, Parker's study warrants replication and extension.

Parker's (1982) study involved a semilaboratory situation at the college level in the United States; the present research used a more natural school environment at the high-school level in Israel. Furthermore, we thought that the different language structures of English and Hebrew could shed light on whether the MOMMY AND I ARE ONE phenomenon is attributable to the semantic value of the words used rather than to their structural configuration. The present study, to our knowledge, is the first attempt at replication of this phenomenon in a language other than English.

The research and theorizing regarding the symbiotic-stimulation technique has not gone without critical reaction. The very notion that such a fleeting stimulus, even under conditions of repeated administration over time, could have effects such as those described has stimulated skepticism. Not surprisingly, the phenomenon does not always occur when tested (e.g., Condon & Allen, 1980). In the Condon and Allen (1980) article, the authors raised objections to one of the first demonstrations of subliminal symbiotic stimulation (Silverman, Frank, & Dachinger, 1974) in terms of the statistics used and the questionable reliability of the measure of change. Thus, we should note that our study (as well as most of the other later studies in this area; see Silverman, 1982a) is not vulnerable to these criticisms. On a more positive note, methodological refinements of the present study include the use of two versions of the symbiotic stimulus.

Method

Subjects

Subjects were selected from four mathematics classes in a high school in a middle-class socioeconomic area in Jerusalem, Israel. There were 152 students in the four classes, but 12 were denied parental permission to participate. The remaining 140 were randomly assigned to four treatment groups, each to receive a different sub-

liminal message. An a priori decision was made to eliminate from the data analysis (a) those students who did not come from a Hebrew-speaking home (the subliminal messages were in Hebrew, and Silverman, 1982b, has noted that subliminal psychodynamic messages tend not to work with persons whose native language is different from the language of the messages), (b) those for whom illness or other personal problems interfered with their school attendance during the 6 weeks of the study, and (c) those who could not be matched with other students for sex, mathematics class, and prior mathematics ability.[2] Thirteen children were eliminated for the first reason, 35 for the second, and 20 for the third. Thus, the final sample consisted of four groups of 18 children matched for the three variables referred to above.[3] The four stimulus conditions (see below) were randomly assigned to the four groups.

Stimuli and Tachistoscope

There were four stimulus messages, each printed in Hebrew letters on two lines on white 3″ × 5″ (7.7 cm × 12.8 cm) cards. The symbiotic stimulus used by Parker consisted of the phrase MOMMY AND I ARE ONE. Pilot work was carried out to develop a reasonable Hebrew approximation of the original message. A number of possible Hebrew translations were considered, each connoting a slightly different concept of oneness. Of six possible translations, a group of 15 bilingual (Hebrew–English) people provided data that led to the selection of two translations as being the most similar in emotional meaning to the original English phrase.[4] One of these represents a literal translation and the other an idiomatic translation. Parker's MY PROF AND I ARE ONE stimulus was first changed to MY TEACHER AND I ARE ONE so that it would be appropriate for high-school students and was then translated into Hebrew (using a literal translation). The fourth message, intended as a neutral control stimulus, was a translation of PEOPLE ARE WALKING IN THE STREET with the last three words added to Parker's PEOPLE ARE WALKING to control for length of the message necessitated by the differences between Hebrew and English. Each student had his or her own stimulus card with his or her name printed on the back.[5]

The stimuli were presented by means of an electronically controlled three-field mirror tachistoscope (Ralph Gebrands Company, Harvard Tachistoscope, Model G1130). The subjects looked through an eyepiece at a blank field (the illumination of which was 15 footlamberts, or 51.3939 cd/m^2), and the stimulus was exposed from another field (the illumination of that being 10 footlamberts, or 34.2626 cd/m^2). All exposures were for 4 msec, and the viewing distance was 31 inches (.78 m). In previous experiments under similar conditions no subjects were able to recognize the content aspect of any stimulus and less than 10% could discriminate between the flashes of light produced by different stimuli (Silverman, 1976).

In order to ensure that the above tachistoscopic conditions precluded the students' becoming aware of any aspect of a stimulus, the following procedure was instituted prior to the study proper being undertaken: A group of 28 children randomly selected from the same student population that was to be used in the study proper participated in a task designed to establish their threshold for reporting any aspect of a stimulus. The message (in Hebrew) SPORT IS GOOD FOR BODY AND SOUL printed with the same lettering as that of the messages used in the study proper was exposed under the above-described tachistoscopic conditions starting at 4 msec and increasing by 1 msec for each succeeding exposure. Students were encouraged to report each time whatever they saw, even if it was only a dot or a line. The first report of anything (other than a light flicker, e.g., "a line") was at 12 msec, with the mean first report at 15.4 msec. The first report of seeing a letter was at 14 msec, with the mean report at 25.7 msec. The first report of seeing the entire message was at 22 msec, with the mean at 33.8 msec. Because the exposure speed in the experiment to be undertaken was to be 4 msec, it was concluded on the basis of the above-described data that the exposure speed would be well below threshold.

Procedure

The four mathematics classes were taught by three female teachers. It was they who prepared and administered three in-class mathematics examinations at 2-week intervals during the course of the experiment, with only the uniformity of the timing of their administration being an accommodation to the experimental procedures. They were briefed on the purpose and procedures of the study but not on the stimulus conditions.

The experimenter (SA) was introduced to the students by the mathematics teachers at the beginning of one of the classes. The experimenter described the program as designed to help students achieve better grades in mathematics. It was explained that they would be looking into the viewer of a machine called a tachistoscope four times a week for a period of 6 weeks.

The tachistoscopic intervention was then described in the following manner:

> This is a machine that will present a message to you at a speed so rapid that you will be unable to consciously detect it. You will only see a flicker of light.

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[2] "Prior mathematics ability" was gauged by subjects' math marks for the previous trimester averaged with their marks for the previous term. Subjects were considered a "match" if their average marks fell within five points of each other.

[3] The matching for mathematics classes and for sex was not perfect but close to it. With regard to sex, for example, there were 10 males and 8 females in three of the four groups and 9 males and 9 females in the fourth group. The success in matching for prior mathematics ability (see Footnote 1) was borne out by the results of a one-way analysis of variance (ANOVA) on the average marks for the four treatment groups ($F = .59$, *ns*).

[4] See Ariam (1979) for a description of how these data were collected as well as the Hebrew translations of the messages used in this study.

[5] A stimulus card consisted of the 3″ × 5″ (7.7 cm × 12.8 cm) card the stimulus was printed on glued to a second card that gave it added thickness. This prevented the stimulus message from being visible through the back of the card so that the experimenter could remain blind to the stimulus conditions.

> The message, however, will register subconciously. Research in the United States has shown that when certain messages are viewed in this fashion they can have a beneficial effect on grades; we will be studying the effect of four different messages in order to see if they can improve academic performance in mathematics. After the study is completed, each student will be told the message that he or she has received and the details of the study.

The students as a group then were given details of a typical individual tachistoscopic session. They were told that a study "tip" would be displayed on the blackboard of the experimental room that would also be used by the mathematics teachers, adapting the tip to each student's special learning problems. The study, they were told, was designed to help them cope with tension that interferes with studying. They were further instructed that they would be asked at each session to imagine a tense situation related to school, such as tension experienced before or during a test in mathematics, when called on to solve a problem at the blackboard, when waiting for results of a test, and so forth, and to look into the tachistoscope when the feeling of tension was there. (This procedure has been used in earlier research by Martin, 1975; Parker, 1982; and Schurtman, 1978 in order to link the message to the reduction of tension.) The exact briefing they heard before they looked into the viewer was

> I would like you to experience tension related to school matters. When you begin to feel it, look into the machine and after I say "Ready, get set" you will see a flash of light. It will be repeated ten seconds later. I would like you to think of these flashes whenever you feel somewhat tense about school.

There was a different stimulus card for each student, containing one of the four messages previously described. The procedure was conducted in triple-blind fashion in that (a) the teachers who taught the students were not informed of the children's stimulus assignment, (b) each student was unaware of the content of his or her stimulus (see the earlier description of the threshold task carried out to ensure that the 4-msec exposure was below threshold; see also the additional check on the subliminality of the messages carried out during the debriefing session that is described below, and (c) the experimenter also was blind to conditions. She inserted the stimuli into the tachistoscope, guided only by the name of the subject printed on the back of the stimulus cards and taking great care not to look at the front of the cards.

The schedule of treatment for each class was posted in the classroom, and the students were urged to come on time in alphabetical order to receive their treatment. One student was assigned to help with sending the students in an orderly fashion.

If, for any reason, a student did not receive his or her "flashes" before the mathematics class, that student was instructed to appear immediately after the class to receive "make-up flashes." If a whole class missed mathematics because of a teacher's absence, it was arranged for them to get the tachistoscope exposures at a later date.

Throughout the research, participation was at a high level with many positive comments expressed. The best proof of the students' interest was the fact that they continued to come for the flashes despite considerable inconvenience, the sacrifice of intermission time, and no incentive offered except the hope of improved grades. A playful atmosphere developed around the project. The students would urge each other to get their daily dose of flashing: "Did you get flashed today?"; "Did you see the flasher?"; "Have you been in the flashing room?" The attitude toward the experiment and the experimenter may be described as positive and warm.

After the last mathematics test was administered, there was an additional session in which a further check was made into whether each student was aware of his or her stimulus message, followed by debriefing. The check consisted of first telling the student what the four messages were and then asking him or her to guess which of the four had been exposed during the 6-week intervention period. Sixty-five of the 72 students came for this additional session. Forty-seven students were incorrect in guessing their messages, and 18 were correct, this result clearly falling with chance expectations, $\chi^2(1) = .25, p > .50$. This provided further evidence that the students had not been aware of the stimulus content, as did students' reactions when they were debriefed. They typically expressed disbelief and stated that they had suspected that their message contained such phrases as STUDY HARDER and LEARN YOUR MATH. This then supported the suppositions that the tachistoscopic exposure level, which was based on both past research and the threshold task that was administered prior to the experiment, precluded the students from becoming aware of their stimuli. Also relevant to this issue were the students' responses to a follow-up question. When asked "What makes you think you received the message that you just selected?" no student indicated seeing even a letter from the message during what they termed *the flashes*. In terms of the reasons they did give (such as "it was just a feeling"), there were no differences in the speculations made by the students in the four groups.[6]

Results

The hypothesis of the study was that the 4-msec tachistoscopic exposure to the three oneness messages would result in higher grades on the final examination in mathematics than would the tachistoscopic exposure to the control message.

The primary data to be analyzed consisted

[6] An anonymous reviewer noted that more stringent tests of the subliminality of the stimulus exposures used in this study would have included (a) 4-msec exposures of the stimuli immediately before the task in which subjects guessed which of the four messages they received and (b) a "detection task" in which subjects were asked to distinguish a stimulus card from a blank card. We agree. However, if one considers the results of the guessing task as given, together with the results of the threshold task administered prior to the study proper, the available evidence can be said to support our designation of the exposure level as "subliminal."

Table 1
Means and Standard Deviations for Mathematics Grades for Each Treatment Group

	Group							
	1		2		3		4	
Examination	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1	68.33	20.61	68.16	17.02	60.16	18.57	63.66	18.28
2	71.50	15.45	71.95	18.56	66.38	21.61	69.16	21.38
3	80.27	19.73	83.61	16.83	68.92	18.19	66.94	16.90

Note. Group 1 = literal translation of MOMMY AND I ARE ONE; Group 2 = idiomatic translation of the same message; Group 3 = translation of MY TEACHER AND I ARE ONE; Group 4 = translation of PEOPLE ARE WALKING IN THE STREET.

of the scores on the final one of the three mathematics examinations for the four groups—those students who had received (a) the literal translation of MOMMY AND I ARE ONE, (b) the idiomatic translation of the same message, (c) the translation of MY TEACHER AND I ARE ONE, and (d) the translation of PEOPLE ARE WALKING IN THE STREET. Table 1 presents the means and standard deviations of the students' mathematics scores for each of the four treatment conditions over the three test administrations.

A one-way ANOVA revealed a significant treatment effect, $F(3, 68) = 3.99, p = .01$. Duncan multiple comparisons were then carried out, yielding significant differences between each of the two groups receiving the translations of the MOMMY AND I ARE ONE message and the control group ($p < .05$ in both instances). The group receiving MY TEACHER AND I ARE ONE, however, was not found to be superior to the control group, and the two MOMMY groups were not different from each other.

To check the effect of shorter periods of exposure to the experimental conditions, the examination grades after the first 2 weeks and after the second 2 weeks also were tested by means of a one-way ANOVA. In neither instance were the results significant, $F(3, 68) = 1.08$ and .80, respectively. It would seem that sufficient time or exposure or both are needed in order to permit the MOMMY AND I ARE ONE effect to take place.[7]

Supplementary Analyses

Parker (1982) found that although the targeted behavior of his subjects (their grades in a business-law class) was affected by the experimental condition, other behavior was not. Differences among his three groups were not significant for other courses that the students were taking. We also had data available to examine if the adaptation-enhancing effects of the MOMMY stimuli extended beyond the mathematics grades that were targeted in this study, namely, grades in other courses and scores on the Spielberger Anxiety Scale. As is detailed elsewhere (Ariam, 1979), on neither of these measures was there a significant treatment-group effect.

Other supplementary analyses involved testing for whether the sex of the students and the mathematics classes they were in (variables for which the two groups were matched) interacted with the stimulus messages. In neither case were the interactions significant (Ariam, 1979).

Discussion

The major finding of this study was that the 4-msec exposure of both a literal and idiomatic Hebrew translation of MOMMY AND I ARE ONE enhanced the mathematics ability

[7] A two-way ANOVA also was carried out for time (three tests) and treatment (four groups). The effect for time was significant, $F(2, 136) = 8.96, p = .001$; the effect for treatment approached significance, $F(3, 68) = 2.40, p = .076$; and the interaction was not significant, $F(6, 136) = 1.33$. The fact that the overall treatment effect (i.e., the average treatment effect for the tests at 2, 4, and 6 weeks) just missed significance does not detract from the unequivocal finding from the one-way ANOVA reported above; our hypothesis was that only after 6 weeks of the intervention would the experimental stimuli affect grades.

of Israeli high-school students. These results are consistent with the findings of studies with varied populations (summarized in Silverman, 1982b), indicating that this intervention can bring about positive behavior change. In particular, the current findings are congruent with those of Parker (1982), who found that stimulation with the MOMMY AND I ARE ONE message led to higher grades in a college business-law course. The present study extends these results to another country in which a different language is spoken, to high-school rather than college students, and to another subject area, mathematics.

The current study also offers strong support for the assumption that the adaptation-enhancing effects produced from the 4-msec exposure of MOMMY AND I ARE ONE can be attributed to the content of the message rather than to the structural configuration of particular letters, words, or word groupings. Although it would have been difficult to explain these effects on the basis of structural configuration and although there has been suggestive evidence in the past that contradicts such an explanation,[8] such a possibility could not be ruled out as long as only one structural configuration elicited positive findings. In the current study not only did two Hebrew MOMMY translations raise math test grades but one of these translations was much more structurally similar to a stimulus that did not produce this effect (MY TEACHER AND I ARE ONE) than it was to the other MOMMY translation.

Unlike Parker's study, the instructor stimulus MY TEACHER AND I ARE ONE did not raise test scores. The difference between the effects of the MOMMY and TEACHER messages in the current study might be explained by the different connotations carried by the two objects of oneness, the good mother of childhood and teacher. Parker reported an "earlier effect"[9] for the MOMMY message than the PROF message and suggested that this might be because the MOMMY image connotes a more unconditionally and fully supportive figure than does PROF. Perhaps, then, the TEACHER message did not work in the current study because the image of teacher in Israel connotes a less supportive figure than PROF does in the United States. Consistent with this are reports (Malchior, 1976; Zak, 1977) of the Israeli teacher typically being more impersonal and remote than teachers in the United States, frequently operating in an ex cathedra, authoritarian style. This kind of teacher may not invite identification, much less convey a feeling of warmth and security that resembles what emanates from the good mother. If these differences in the way instructors in the two countries are generally perceived was in fact the reason why the TEACHER group in the current study failed to show stimulus effects, it suggests that in order for a fantasy of oneness to be facilitative of positive behavior change, it must involve a figure who connotes supportiveness.

It is also possible that differences in the design of the two experiments account for Parker's obtaining an effect with the PROF message and our obtaining no effect with the TEACHER message. Parker, who was the students' professor, taught and counseled them, as well as served as experimenter. This could have allowed the students who received MY PROF AND I ARE ONE to unconsciously link the message to their own instructor, making the message more appealing. In the current study where the experimenter did not teach or counsel the students, this linkage would have been absent. Even if the linkage was made, in light of what was said above about the Israeli teacher, a fantasy of oneness with MY TEACHER may have been less appealing. This could have been especially the case because mathematics instructors tend to be perceived as less involved in the affective domain, less understanding, and less encouraging than other teachers (Adams & Biddle, 1970; Astin, 1965; Steele, 1974), and among Israeli teachers specifically, Malchior (1976)

[8] Structurally similar messages such as MOMMY AND I ARE ALIKE (Bronstein, 1976) and DADDY AND I ARE ONE (Kaye, 1975) have not resulted in ameliorative effects in samples of male schizophrenics, whereas the same samples were positively affected by MOMMY AND I ARE ONE. See also Silverman and Fishel (1981) for a summary of results from a series of dart-throwing experiments in which stimuli that were structurally different but had similar psychodynamic content (related to oedipal motives) produced the same behavioral effects.

[9] Parker (1982) found that whereas the MY PROF AND I ARE ONE stimulus only affected grades on the test after 6 weeks, the MOMMY AND I ARE ONE stimulus raised grades on the test at 4 weeks as well as at 6 weeks.

found that compared to other teachers mathematics teachers receive lower evaluations from students.

Returning to the main finding, the generality of the symbiotic fantasy has now been demonstrated in another culture using a different language system.

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Received January 12, 1982
Revision received May 6, 1982 ■