The effects of self-reliance on the successful use of self-reinforcement: a thesis...

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THE EFFECTS OF SELF-RELIANCE ON
THE SUCCESSFUL USE OF SELF-REINFORCEMENT

A Thesis
Presented to
the Faculty of the Graduate School
University of the Pacific

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by

Sandra L. Thomas

October 1976
This thesis, written and submitted by

[Name]

is approved for recommendation to the Committee on Graduate Studies, University of the Pacific.

Department Chairman or Dean:

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Thesis Committee:

[Signature] Chairman

[Signature]

[Signature]

Dated 7/2/74
ACKNOWLEDGMENTS

With appreciation to my committee.

To John for providing invaluable experience.

To Roger for his support and his students.

And especially to Martin for his constant nagging and constant help.

Also, thanks to Kathy and her tic.

Very special thanks to Stuart for his confidence.
Self-reinforcement is the process by which an individual sets contingencies on his own behavior then rewards himself for successfully meeting these contingencies. In recent years, self-reinforcement has become an accepted therapeutic tool with application to many settings and problems. It has been employed as a part of a larger treatment package or used alone for a variety of clinical concerns (e.g., then reduction of disruptive classroom behavior, Bolstad and Johnson, 1972; weight loss, Jeffrey, 1975; and Mahoney, Moura and Wade, 1973).

Lately investigations have asked whether individuals influence the effectiveness of self-reinforcement. Heaton and Duerfeldt (1973) suggest that they do. These authors propose that self-esteem (i.e., a person's evaluation of himself) and self-reinforcement are related within the same theoretical framework, since they may both be considered components of an individual's self-evaluative process. They developed this conclusion in a paper that investigated self-esteem, self-reinforcement and internal-external locus of control and their interrelationships. The authors reasoned that a person's self-esteem is a product of his self-evaluative responses, and these responses can be the stimuli for behaving in certain ways. Also, if they are contingent upon a given response, self-evaluative responses can be considered self-reinforcers.
For example, a student begins writing a paper soon after it is assigned. He completes it with no problem before the due date, as opposed to procrastinating until closer to the deadline and handing in a hurriedly written paper of poorer quality. He evaluates his behavior and is pleased with himself for having chosen the better alternative. The pleasure with himself, which was contingent upon the response, can be seen as a reinforcer. Self-reinforcement, by definition, serves as a determinant of future overt behavior. Significant correlations found by Heaton and Duerfeldt between measures of self-esteem and self-reinforcement supported their argument. The measures of self-esteem consisted of two paper and pencil tests, Gough's Adjective Check List and the Index of Adjustment and Values. These were administered to the subjects, volunteers from introductory psychology classes, during regular class sessions. The subjects also participated in a modified version of the Time Estimation Task which was used to assess their levels of self-reinforcement. This was done in groups of 20-30 in a language laboratory setting where subjects estimated the duration of a tone. If they considered their estimates to be close to the actual length of the tone, they were to reinforce themselves by placing a check in the column marked "I deserve a reward."

Internal-external locus of control (i.e., the extent to which individuals believe that the control of their
behavior lies internal or external to themselves) was also found to be moderately correlated with self-reinforcement. The device used to measure degree of externality was the James I-E scale. Degree of externality was negatively related ($r = -.60$) to the amount of self-reinforcement given in the time estimation task.

These results seem logical. Since an internally oriented person believes he controls himself and since reinforcement is a means of controlling behavior, self-reinforcement fits with his pattern of behavior. An externally oriented person, however, might not accept self-reinforcement as a feasible means of controlling his own behavior because he believes control comes from outside himself.

The relationship of internal-external locus of control to self-reinforcement has been investigated by other authors. Marston (1964) compared "external" and "internal" college students on their use of self-reinforcement over five different tasks and found that internals reinforced themselves more frequently. Not only did they make greater use of self-reinforcement, but this use coincided with an increase in frequency of correct responses over trials, while externals showed a decrease in correct responses as their number of self-reinforcements increased.

In a recent study, Schallow (1975) compared internals and externals on their successful use of self-modification
procedures on diverse behaviors. Forty-five undergraduates enrolled in an abnormal psychology class (who chose the option of participating in a self-modification project to fulfill a class requirement) served as subjects. The results showed that the most successful self-modifiers were significantly more internal on the Rotter (1966) Internal-External Control Scale than the least successful subjects. In addition, the successful subjects reported their projects as being more successful on a questionnaire and had higher course grades.

Bellack (1972) also related the internal-external dimension to self-reinforcement. In his study, external and internal subjects were trained to a 60% criterion through external reinforcement on a verbal discrimination task. After training, they were instructed to reinforce themselves for correct responses. No difference was found between internals and externals in the amount of reinforcement given or in whether it was contingent on the correct response. Although these results are inconsistent with the findings discussed previously, the majority of the data support the hypothesis that locus of control and self-reinforcement are significantly related (Heaton & Duerfeldt, 1973; Marston, 1964; Schallow, 1975).

Several studies, including Heaton and Duerfeldt's, have found a relationship between internal-external locus of control and self-esteem, indicating that degree of
externality is negatively correlated with level of self-esteem. Fish and Karabenick (1971) investigated this relationship with a male population by correlating scores on Rotter's I-E Scale and Janis and Field's (1959) Feelings of Inadequacy Scale. Ryckman and Sherman (1973) replicated the study including females in their population. Both studies revealed significant correlations, indicating that men and women with higher self-esteem tend to be internally oriented.

Fitch (1970) investigated the relationship of internal versus external attribution of causality with self-esteem in a dot estimation task. This task involved viewing ten slides containing randomly distributed dots for 3 sec. and then estimating the number of dots on every slide after it was viewed. This research looked at complex relationships between choice, self-esteem and success, and their effects in determining causality. One specific aspect, the attribution of success to one's own ability, was chosen as a basis for comparison due to its relevance to the research previously discussed. (It was considered most relevant in the respect that the above research used Rotter's scale or James' (1957) Rotter based scale to assess internality and externality.) The criterion for judging whether a person perceived himself as being controlled by internal forces on these scales was based on that individual's skill level or ability in certain areas,
such as skill at one's job, ability to make friends, ability to produce change, etc. The results, consistent with those of research already discussed, indicated that high self-esteem individuals tend to internalize causality of success to a greater extent than do low self-esteem individuals (86% of the time as opposed to 68%).

This author feels the reason for the discrepancy of results in research on self-esteem and locus of control as proposed by Heaton and Duerfeldt and others is that different measures of self-esteem were used which may relate to differing aspects of the construct. This implies that perhaps only certain components of self-esteem correlate with and affect locus of control.

It is interesting to note that self-reinforcement can be considered within the framework of individual differences, as are self-esteem and locus of control. The results of Kanfer, Duerfeldt and LePage (1969) and Marston (1964) support this. Both studies indicate the existence of stable, individual patterns of self-reinforcement. Kanfer et al. investigated the rate of self-reinforcement over two unrelated tasks with college students and found it to be characteristic for each individual and varying across individuals. Marston found significant correlations in the rate of self-reinforcement over five different tasks with each subject using three types of reinforcers: light, poker chips and self-ratings.
The present study was designed to examine the relationship between the success of self-reinforcement (as defined by its effectiveness in increasing a given response) and a specific aspect of positive self-esteem that would seem most clearly related to the effectiveness of self-reinforcement, valuing one's own opinions and judgements highly. Self-esteem implies a positive feeling or attitude about oneself. One factor involved in the acquisition of this positive attitude is the level of the individual's confidence in the legitimacy of his own opinions. The more confident a person is that his opinions are of value, the more likely it is he will have a high self-esteem.

Theoretically, the value an individual places on his opinions would affect self-reinforcement in two ways. First, a reinforcer by definition must be strong enough to produce behavior change, i.e., it must be valued by the individual being reinforced (Mahoney & Thoresen, 1974; Watson & Tharp, 1972). Therefore, in self-reinforcement, the praise given to oneself would not be effective unless that person valued his own opinion, just as the praise given by another would be reinforcing only if that person's opinion were considered worthwhile. Also, it seems logical to the present author that reinforcers other than social ones would increase in value as the person doing the reinforcing became more esteemed.
The second factor affecting the success of self-reinforcement is the accuracy of the delivery of the reinforcer. Reinforcement must be given contingent upon a correct response in order to be effective. If a person does not value his own opinion, it is logical to assume he will not trust his judgement on when his behavior deserves reinforcement, i.e., when he has emitted a correct response. This could result in inaccurate delivery, in which case a self-reinforcement program would not be effective.

The concept of valuing one's own opinion is related to internal-external locus of control, therefore, it was expected that the results of the present study would be similar to those of previous research which observed positive relationships between internal locus of control and success in self-reinforcement. Descriptions of internals conform to the descriptions of individuals who value their own opinions highly. Lefcourt (1966) in his review of the locus of control literature depicts "internals" as being self-confident, a concept related to valuing one's opinion in that a self-confident person has high expectations of success. These high expectations require that the person value his own opinion.

It should be noted that a person might have faith in his own judgements but still make faulty decisions as to when it is appropriate to deliver reinforcement. For example, a person who trusts his own opinion might be
overgenerous in reinforcing himself, delivering it for very small approximations of the desired behavior.

The present study investigated the use of self-reinforcement in treating the behaviors of nailbiting and low participation in group discussion in two separate experiments. The subjects in both experiments were scored on a scale constructed by the author which attempted to measure the level at which they valued their own opinions. The relationship between the two variables, success at self-reinforcement and the score on the scale, was then ascertained.

Support for the hypothesis could have practical implications for the use of self-reinforcement in clinical and therapeutic situations. For example, before a therapist prescribed a self-control technique such as self-reinforcement, the value his client places on his own opinions could be determined. By doing so the therapist could then avoid using self-reinforcement techniques with clients who probably achieve little success by their use. The differential use of treatment procedures could thus be accomplished more efficiently and with greater effectiveness.
METHOD

Experiment 1

Subjects

Eight female and five male students from the University of the Pacific served as subjects. All were of freshman or sophomore standing and were enrolled in a required general studies course. The subjects were volunteers from a pool of persons who were deficient in fulfilling one course requirement, verbal participation in the weekly group discussions. Participation in the present research project was offered as a possible means by which to alleviate this problem. (See the Procedure section for details concerning subject recruitment.)

Settings

Treatment observations were made in the classroom designated for weekly discussions. The setting (location and time) varied across subjects depending upon in which of the six discussion groups they were registered, but it was constant for each of the subjects throughout the study.

The setting used for training was the author's office located on campus in the Psychology Department. The office consisted of a single large room housing three graduate teaching assistants and their desks (none of which were occupied at the time of training except for the author's). Training was conducted during a one-half hour meeting with the subjects.
Observers

Three undergraduate proctors, who also served as discussion leaders, acted as observers. All were naive to the fact that any research was being conducted with their students, in order to prevent them from differentially reinforcing the participants in this research for verbal contributions to the discussions. Data were recorded under the pretext that they were to be used by the teacher for evaluative purposes on the requirement of discussion participation (which, in fact, was done).

At the onset of the course the proctors were given a check sheet (see Appendix A) on which they were to record legitimate verbalizations made by the students during discussion, with the response definition typed at the top. This was done in the hope that it might provide some assurance against observer drift, i.e., a shifting of the original definition of the behavior over time.

Response Definition

The dependent variable was participation in group discussion, i.e., the number of legitimate verbalizations made by the subjects during each weekly group discussion. A legitimate verbalization was defined as a serious statement made by the subject which pertained to the topic scheduled for that week's discussion. Therefore, no questions or statements concerning class format or business were counted, nor were simple "yes/no" replies to a proctor
question. A legitimate verbalization was scored on an evaluation sheet as a check next to the subject's name in one of the four fifteen-minute blocks in the column corresponding to the discussion date. (Refer to the Procedure section for more detail concerning legitimate verbalizations and how they were scored.)

A legitimate verbalization was recorded after one individual stopped talking and someone else began. For instance, Student A might make all or part of a statement and then be interrupted by Student B's comment. If Student A waited until B finished and then retorted or continued from where he was before he was interrupted, this was scored as two verbalizations for A and one for B. If Student B had just interjected a statement of agreement or disagreement without interrupting A to the point that A stopped talking completely, then it would be scored as one for A and one for B.

Reliability

Reliability observations were made by the author, who was the head teaching assistant for the course and attended the group discussions on a regular basis. An independent observer was not used in this study for reliability observations. This was due to the fact that his/her presence in the discussion group could not have been explained in such a way as to not arouse the suspicion of the proctors that research was being conducted on their
discussion groups. Only the author had a legitimate excuse for attending the discussion groups, her pretext being to obtain information for the evaluation of the proctors. Reliability observations were made twice for each group leader during pre-treatment data-taking and twice for each group leader during treatment. Reliability of measurement was determined by the method of interrater agreement (agreements/agreements and disagreements x 100). For each reliability check, a percentage interrater agreement was obtained for each subject for each interval. This percentage was averaged across the intervals for each subject and then averaged across all subjects, yielding one percentage for each reliability session. The reliability figures between the author and the proctors were as follows: 98% for session 1, 100% for session 2, 88% for session 3, and 82% for session 4.

Self-Reliance Scale

The construct around which the scale is constructed is the extent to which one values his own opinion highly or self-reliance. This specific construct was chosen because of its possible relation to the successful use of self-reinforcement. If one does not value his/her own opinion, a self-applied reinforcer might not be strong enough to produce behavior change. In addition, a lack of reliance on one's opinion of when he/she has emitted a correct response could result in inaccurate delivery of reinforcement.
Either of these variables could make self-reinforcement ineffective.

After having defined the construct, 60 items were generated, each constructed on the basis of representing a behavior having some relationship to how much a person values his own opinion (see Appendix B). These 60 items were then presented to a population of 300 college students enrolled in several psychology classes, both upper and lower level. Item-total correlations were performed on the data to determine which items related most strongly to the construct (see Nunnally, 1967).

The table below presents the 20 items having the highest correlations with the total scores, together with these correlations, in ranked order. (According to Nunnally, correlations of .4 and above are acceptable.) These 20 items constitute the scale that was later administered during the actual study.

This final scale was administered to 100 college students enrolled in two lower level psychology courses to obtain further information on the nature of the scale and the distribution of obtained scores. Care was taken to avoid overlap of students taking the test in both its initial and final forms. Students were asked to indicate on the top of the final scale whether they had been in one of the classes to which the initial 60 items had been administered.
You are deciding what kind of car to buy; you like one kind and the person with you likes another. How much would you trust your own opinion over the other person's, if that person were a close friend?  

*2. You are choosing a college to attend; you have one preference and the person with you has another. How much would you trust your own opinion over the other person's if that person were a close relative?  

3. Same as item 2 but concluding with "a close friend".  

4. You are deciding on what career to enter; you have one preference and the person with you has another. How much would you trust your own opinion over the other person's if that person were a close friend?  

*5. If another person's opinion is different from your own, how strong does it have to be before you change yours and conform to the other person's if that person is a close friend?  

6. Same as item 4 but concluding with "a close relative".  

7. Same as item 2 but concluding with "a close relative".  

Table 1

<table>
<thead>
<tr>
<th>Items</th>
<th>Item-Total Correlations</th>
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</thead>
<tbody>
<tr>
<td>1. You are deciding what kind of car to buy; you like one kind and the person with you likes another. How much would you trust your own opinion over the other person's, if that person were a close friend?</td>
<td>.63</td>
</tr>
<tr>
<td>*2. You are choosing a college to attend; you have one preference and the person with you has another. How much would you trust your own opinion over the other person's if that person were a close relative?</td>
<td>.57</td>
</tr>
<tr>
<td>3. Same as item 2 but concluding with &quot;a close friend&quot;.</td>
<td>.56</td>
</tr>
<tr>
<td>4. You are deciding on what career to enter; you have one preference and the person with you has another. How much would you trust your own opinion over the other person's if that person were a close friend?</td>
<td>.54</td>
</tr>
<tr>
<td>*5. If another person's opinion is different from your own, how strong does it have to be before you change yours and conform to the other person's if that person is a close friend?</td>
<td>.54</td>
</tr>
<tr>
<td>6. Same as item 4 but concluding with &quot;a close relative&quot;.</td>
<td>.53</td>
</tr>
<tr>
<td>7. Same as item 2 but concluding with &quot;a close relative&quot;.</td>
<td>.53</td>
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Table 1. Continued

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<thead>
<tr>
<th>Item</th>
<th>Item-Total Correlations</th>
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</thead>
<tbody>
<tr>
<td>8. You are in a store buying an article of clothing; you like one article and the person with you likes another. How much would you trust your own opinion over the other person's if that person were a close friend?</td>
<td>.52</td>
</tr>
<tr>
<td>9. Same as item 4 but concluding with &quot;a casual acquaintance&quot;.</td>
<td>.52</td>
</tr>
<tr>
<td>10. Same as item 4 but concluding with &quot;a person knowledgeable about the careers in question&quot;.</td>
<td>.52</td>
</tr>
<tr>
<td>11. Same as item 2 but concluding with &quot;a casual acquaintance&quot;.</td>
<td>.51</td>
</tr>
<tr>
<td>12. Same as item 5 but concluding with &quot;a close relative&quot;.</td>
<td>.50</td>
</tr>
<tr>
<td>13. After hearing what everyone else has to say in discussion, my ideas seem insignificant.</td>
<td>.48</td>
</tr>
<tr>
<td>14. Same as item 1 but concluding with &quot;a casual acquaintance&quot;.</td>
<td>.48</td>
</tr>
<tr>
<td>15. You are making a decision on whether to marry a particular person; you want to marry this person and the person with you is opposed. How much would you trust your own opinion over the other person's if that person were a close friend?</td>
<td>.48</td>
</tr>
<tr>
<td>16. Same as item 2 but concluding with &quot;a person knowledgeable about the colleges in question&quot;.</td>
<td>.47</td>
</tr>
<tr>
<td>17. Same as item 5 but concluding with &quot;a close relative&quot;.</td>
<td>.47</td>
</tr>
</tbody>
</table>
Table 1. Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Item-Total Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>*18. After I have made a well-thought out decision, I stick to it in the face of disagreement.</td>
<td>.46</td>
</tr>
<tr>
<td>19. Same as item 8 but concluding with &quot;a close relative&quot;.</td>
<td>.44</td>
</tr>
<tr>
<td>*20. In arguments, I am easily won over to the opposition's side.</td>
<td>.44</td>
</tr>
</tbody>
</table>

Rating Scale

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>never trust own opinion</td>
<td>sometimes trust own opinion</td>
<td>always trust own opinion</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>* 1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>agree</td>
<td>disagree</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

**1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| weak | strong |
Procedures

Prior to the start of the semester, there was a meeting of the three proctors, the teacher and the teaching assistant (author) at which time the grading system was explained. Included in this explanation was the requirement for student participation in group discussion. The response definition and the use of the evaluation sheet were explained as follows:

Ten % of the final grade for this course will be based on how much each student contributes to the weekly discussions. In order to assess participation in group discussions, each of you will be using this evaluation sheet on which to record legitimate verbalizations. By this we mean any serious statement made by the subject which pertains to the topic scheduled for that week's discussion, other than a simple "yes/no" response. Therefore, no questions or statements concerning class format or business will be counted. This definition is printed at the top of the sheet so that you will have it to refer to when necessary.

The sheet consists of the name of each student in your discussion group and a column corresponding to the date of every discussion. The discussion date column is divided into four 15 minute blocks. A legitimate verbalization will be recorded as a check next to the student's name in the specific 15 min. block in which it occurs for that date. A verbalization is recorded after one individual stops talking and someone else begins. For instance, Student A makes all or part of a statement and is interrupted by Student B's comment. Student A waits until B is finished, then retorts or continues from where he was before he was interrupted. This is scored as two verbalizations for A and one for B. If Student B had just interjected a statement of agreement or disagreement without interrupting A to the point that A stopped talking completely, then it would be scored as one for A and one for B. To make sure we both agree on what you will be recording, it will be helpful to practice now.
Training consisted of the teaching assistant presenting the two hypothetical situations described above in which the proctor recorded the correct number of legitimate verbalizations for Students A and B. Prompts were given if necessary. The training was completed when the proctor correctly recorded once in each situation.

The proctors were also informed that the teaching assistant would periodically attend each discussion group to collect information from which to evaluate them.

The requirement for discussion participation and proctor recording of such was explained to the entire class at their first scheduled meeting as follows:

Ten % of your final grade for this course will be based on how much you contribute to the weekly discussions. In order to assess this, your group leader will be recording how often you participate in the discussions.

Pre-treatment data collection began with the first meeting of each discussion group. The number of verbalizations were recorded in four 15 min. blocks per group meeting, with 20 block scores constituting pre-treatment data. From these data the 13 students who participated the least were determined by adding the checks for each student across discussion meetings.

These students were contacted by the teaching assistant at which times they were told that their proctor evaluation thus far had indicated a deficit in their participation in discussion. They were reminded of the course requirement and asked if they would like to participate.
in a program designed to help them increase their participation in discussion. This was explained as follows:

The reason I am calling is because your participation in the discussions is low in comparison with the rest of the class. Do you realize that this constitutes 10% of your grade? Would you be interested in participating in research of mine designed to help students increase discussion participation? Since the techniques you will be using will be administered by yourself, only a minimal amount of your time (about half an hour) will be required by me for training purposes. The rest involves your practicing a few simple techniques on your own. A complete explanation on the techniques you will be using will be given to you at the training session.

The skills you will learn can also be used in other classes or applied to other problems you may have. Are you interested in this? (If so, they were asked to specify a time they could meet with the teaching assistant within the next week.)

Training

After a meeting time was arranged, the students met with the teaching assistant either individually or in groups, two of which contained two persons and one contained six. At this time they were instructed and trained in the techniques to be used. The training session was conducted in the following manner.

The response definition of a legitimate verbalization was reviewed in the attempt to ensure that the students understood what was being recorded. Each student was informed of his/her average number of verbalizations per discussion up to that point. A target number of responses per discussion (five or six) was then agreed upon, based
on the performance of the students whose participation was considered appropriate. Following this they were reminded of the principles of shaping and were prompted to specify individual sub-goals for each discussion which gradually approached the target number of responses. An example of one of the student-generated programs is as follows: Student A participated in group discussions on the average of once per discussion. He chose as his target number of responses five per discussion. Being that there were five weeks left in the semester, he set four sub-goals as follows: two responses for week one; two for week two; three for week three and four for week four. During the fifth discussion period, he was to achieve his target number of five responses.

The students were then instructed in self-monitoring. It was explained that they needed an accurate record of verbal responses during each discussion in order to determine whether the treatment was producing the desired effect. It was further explained that the way they were to obtain this record was by placing a mark in their notebook under the correct discussion date for every response they made which qualified as a legitimate verbalization. (The class notebook was chosen because of its accessibility.)

The students were also told to graph their data immediately after each discussion. Several reasons were
given for this. The first was that the graph would provide a visual presentation of their weekly progress, which in itself could be reinforcing. Secondly, they were told to transfer the data from their notebook to their graph immediately after each discussion in order to avoid losing the data, and also to provide immediate reinforcement if that week's criterion had been met. Finally, they were told to post the graph in a visible place so that friends and relatives could comment on their progress and reinforce them for it.

The final step in training consisted of instruction in the use of self-reinforcement. The students were told that they needed to arrange for some kind of motivation for increasing participation. They were asked to recall their knowledge of those things which enhance the effectiveness of a reinforcer: it must be strong enough to change behavior, yet practical and accessible; and it must be something that could be given immediately after they met their weekly criterions. If necessary they were given suggestions of possible reinforcers.

After individual reinforcers had been decided upon, each student recounted the procedures to the teaching assistant. They then practiced their specific program in a hypothetical situation to a criterion of one correct demonstration.

A criterion of one correct demonstration was chosen so as to conform with the findings of Kanfer and Marston (1963)
which indicate that the more training a person receives in self-reinforcement, the more likely he is to use the technique correctly. That is to say, if a person receives extensive training in self-reinforcement, he will be successful in its use regardless of any personal characteristics. In the present study, to ensure against "over-training" affecting the success of self-reinforcement to such an extent that it concealed any effects due to the individual differences as reflected by the scale score, training was kept to a minimum. That is, the least amount of training necessary for successful use of self-reinforcement was used.

When the training session was completed the students were asked to initiate their programs at the next discussion group meeting, at which time treatment data collection began. The number of verbalizations were recorded in four 15 min. blocks per group meeting, with 20 blocks constituting treatment data.

The self-reliance scale was administered at a later date to the entire class by the proctors during the group discussion meetings. The proctors explained that a psychology graduate student needed to standardize the scale and asked if they would complete it for that purpose. The subjects' scales were then separated from those of the rest of the class.

To avoid biasing the author in subsequent chance meetings with the subjects, their scales were not scored
until all the treatment data had been collected. Each subject's total score was then obtained by adding the numbers circled on a 10-point continuum for all the items.

Post-Experiment Debriefing

At the end of treatment all subjects were interviewed as to the specifics of their program and whether or not they continued with it throughout the length of the treatment period. They were also asked to comment on the success of the program. The specific questions were as follows: "Did you carry out the program we discussed for increasing discussion participation? Did you use reinforcers? Can you give me some examples of these? Did you ever reach your target number of verbalizations in any discussion? Do you think the program was successful for you? Would you recommend that I suggest it to other students with the same difficulty?"

The self-reported information obtained from this interview resulted in the discovery that only four individuals actually carried out the program as they were asked to, i.e., using self-monitoring and self-reinforcement for the entire length of the program. Five others had either self-monitored or self-reinforced in the beginning but did not continue with it for the entire length of the treatment condition. The remaining five students never initiated the program. The majority of the students recommended
the program for others regardless of whether they themselves had actually practiced it.

After the interview the students were informed of the fact that they had been participating in a research project and were told of the nature of the research and the purpose of the self-reliance scale.

The program I suggested to you on increasing your discussion participation served two purposes: the first was to help you raise your grade and the second was to research what kind of people benefit from the particular procedures you were trained in.

The scale that you filled out in class was to measure how much value you place on your own opinions. The hypothesis behind the research was that people who value their opinions highly will be more likely to achieve success when using self-reinforcement procedures. This is due to the fact that in order for a reinforcer to be effective, it must be valued by the person being reinforced. Therefore, if a person is self-reinforcing, he or she must value their own opinion as to whether or not they deserve reinforcement, and they have to value their own opinion for the reinforcement to be effective.

The results have not been analyzed yet and won't be before I leave for my job. If you would like to know the results, however, you can write me in care of...

**Ethical Considerations**

Two forms of deception took place in the present study. One was in keeping the proctors blind to the fact that they were acting as observers in a research study. The other was in not informing the students in Experiment 1 that the score on the self-reliance scale they completed was to be related to their success with self-reinforcement.
To address the violation of ethics involved in the proctor deception, the author considered that the degree of injury done to the proctors was minimal in comparison with the confounding of the data that could have resulted from reactive effects of observer bias had the proctors been aware of the nature of the research.

The proctor deception did not cause any psychological stress or invasion of privacy to the subjects. However, keeping the subjects blind to what the scale would be used for could be viewed as an invasion of privacy. In responding to this ethical concern, the author refers the reader to research conducted by Farr & Seaver (1975) on how subjects perceive different experimental procedures in terms of psychological stress and invasion of privacy. The authors had 86 subjects rate hypothetical experimental situations on a five-point scale, a score of one meaning no invasion of privacy and a score of five meaning excessive invasion of privacy.

In the present study, the information obtained from the combination of the score on the self-reliance scale and success at self-reinforcement provided the experimenter with the knowledge of how each subject related to the other subjects with respect to the extent to which the value they placed on their own opinions affected their success in using self-reinforcement. This information could theoretically be considered as falling in the category of knowledge about one's self-esteem. The
arguments presented in the introduction of this study support this.

Farr and Seaver found that knowledge about one's self-esteem was ranked by their subjects at a mean of 1.67 on the five-point scale. The hypothetical experimental procedure they presented was a signed personality inventory measuring self-esteem. Some of the situations ranked directly above this one included the following: a signed personality inventory measuring masculine and feminine characteristics and a signed questionnaire about personal usage of hard and soft drugs. The range of the mean rating for the situations was 1.16 to 2.93.

From this the present author concluded that the invasion of the subjects' privacy as a result of the deception seemed to be relatively innocuous in comparison with the information obtained.

**Experiment 2**

After a substantial amount of data were collected and treatment was well underway in Experiment 1, it became apparent that the majority of the subjects in that experiment were not practicing the self-control behaviors in which they had been trained. This information was obtained from casual statements made by the subjects. The author then decided to initiate Experiment 2. In this study, periodic meetings with the author were programmed in the
treatment condition in order to encourage greater participation on the part of the subjects.

**Subjects and Setting**

One male and eight female students from the University of the Pacific served as subjects. They were recruited for the study by advertisements in the college newspaper and announced in classes requesting subjects who were nailbiters and who wanted assistance for this problem.

Stop Nailbiting!! We are in need of volunteers for research involving nailbiting. We are offering a painless but effective method for eliminating this habit. No fee for participating, and involvement in the program will require a minimal amount of time.

The criterion for participation in the study was that at least half of the subject's nails had to be bitten off below the finger tip. In most cases, all 10 nails met this criterion.

Baseline and treatment observations and the training procedures took place in the author's office located on campus in the Psychology Department. Training was conducted during a one-half-hour session with the subjects, during which time a pre-treatment measure of their nail lengths was taken. On two subsequent meetings, separated by two week intervals, a second and third measure was taken of nail length.
Dependent Variables

The primary dependent variable was the subject's average fingernail length measured before and after treatment. This was calculated by measuring each nail to the nearest 1/32 in., and then dividing by 10 to obtain a single score for each subject. Pre and post-treatment measurements for each subject were taken by the author. Reliability observations were made by two psychology graduate students. Reliability of measurement was determined by the method of inter-rater agreement (agreements/agreements + disagreements x 100). For each reliability check, two observers measured all 10 nails of a given subject and then compared their scores for each nail to the nearest 1/32 in. This was done on four occasions throughout the study, yielding an average of 97% agreement. At no time did the observers deviate by more than 2/32 in.

Responses to be self-monitored were described to the subjects as follows: (a) nailbiting - placing one or more fingers in the mouth and removing any part of the nail with the teeth; (b) nail picking - removing any part of the nail with other fingers; and (c) controlled urges to bite or pick the nails - any instance in which the subject had the desire to bite or pick his nails but refrained. These responses were monitored by having the subjects make a slash mark in the appropriate column of a small notepad that was provided by the experimenter and that the subjects were told to carry with them. The
notepad was ruled into two columns, one marked nailbiting/picking and the other marked urges.

Procedure

As noted above, all subjects met for a half-hour training session. During this meeting a pre-treatment measure of nail length was obtained and subjects were trained in the treatment procedures. Training was conducted in much the same way as for the subjects in Experiment 1. The response definitions described above were discussed with each subject. They were instructed in self-monitoring (at which time the use of the notepad was explained) and told to shape themselves gradually into a reduction of nailbiting and to set daily criteria for reinforcement. They were then trained in the use of self-reinforcement as in Experiment 1. After each subject had been trained in the procedures, they practiced them in hypothetical situations to a criterion of one correct demonstration. (See Experiment 1 Procedures for a more detailed accounting of training.)

During this meeting the self-reliance scale was administered. It was explained that the scale was part of a research project, but its function would be divulged at the end of the study in order to ensure against biased responding.
Before you go, I would like you to fill out this questionnaire. It is part of the research, but I cannot tell you its function at this time. You will get a full explanation of the questionnaire, the entire study and the results when we have finished the research. I appreciate your patience and co-operation.

As in Experiment 1, the scales were not scored until all the treatment data had been collected. The procedures for scoring, ranking and analyzing the relationship of the nailbiters' score on the self-reliance scale with their success in using self-reinforcement were the same as in Experiment 1.

Before leaving, the subjects were instructed to return in two weeks, at which time a second nail length measure was obtained. During the second meeting a final follow-up visit was scheduled two weeks later. Thus, unlike subjects in Experiment 1, these subjects had contact with the teaching assistant concerning the self-reinforcement program twice before the debriefing at the end.

At the third and final meeting, nail length was measured again, and an interview similar to the one in Experiment 1 was conducted.

Results

Due to the small number of subjects (four) who practiced the procedures in Experiment 1 (as determined by the questions asked during the debriefing), a correlation
coefficient could not be obtained for these data. However, their self-reliance scale score and improvement score are presented in the table below. The improvement score was computed by subtracting the baseline measurement (the sum of the discussion participation points across the 20 blocks which constituted baseline) from the treatment measurement (the sum of the discussion participation points across the 20 blocks constituting treatment). From an examination of these data, the self-reliance scale score appears to have had little relationship with the success or failure of the self-reinforcement procedures.

<table>
<thead>
<tr>
<th>Scale Score</th>
<th>Improvement Score</th>
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<tbody>
<tr>
<td>S1</td>
<td>171</td>
</tr>
<tr>
<td></td>
<td>-.8</td>
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<tr>
<td>S2</td>
<td>168</td>
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<td>S4</td>
<td>150</td>
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<tr>
<td></td>
<td>-.2</td>
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</table>

Table 2

A Pearson product-moment correlation analysis was performed on the data of Experiment 2 to determine the relationship between the score on the self-reliance scale and the success obtained by using the self-reinforcement procedures. This success was measured by an improvement score computed by subtracting the baseline measurement (length of nails to 1/32 in. before subjects were trained
in self-reinforcement procedures) from the treatment measurement (length of nails to 1/32 in. at the end of the four week treatment period). Those subjects (two) who failed to initiate the procedures (as determined from the debriefing described in the procedures) were omitted from the data analysis, leaving baseline and treatment scores for seven subjects. The analysis produced a correlation coefficient of .27 (critical value for $r$ at the .05 level is .67).

Since no substantial relationship was found between the score on the scale and success at self-reinforcement, an examination was made of other potentially pertinent relationships. The first possibility was that a subject's self-reliance score would relate to the degree to which he/she participated in the program using the procedures in which they were trained. It was thought that subjects with a higher degree of self-reliance might be more likely to sustain participation without external support. Subjects in both experiments were scaled according to their degree of participation in the following manner: 1, assigned to no participation; 2, assigned to the use of either self-monitoring or self-reinforcement in the beginning; 3, assigned to the use of self-monitoring and self-reinforcement in the beginning or the use of either self-monitoring or self-reinforcement throughout the entire treatment condition; 4, assigned to self-monitoring for
the length of the treatment program but self-reinforcement only in the beginning; and 5, assigned to both self-monitoring and self-reinforcement for the entire length of the program. This information was obtained from the questions asked during the debriefing at the end of treatment.

These ranks for each subject were correlated with his/her self-reliance score for each experiment separately, yielding a correlation coefficient of .28 (critical value of \( r \) at .05 level is .50) for Experiment 1 and .19 (critical value of \( r \) is .60) for Experiment 2. In the event that the variance of the self-reliance scores in the individual groups was too small to allow a substantial \( r \) to show up in the separate analyses, the data for the two experiments was then combined and the Pearson \( r \) calculated again. The combined data yielded a coefficient of .20 (critical value of \( r \) at the .05 level is .40).

To evaluate whether participating in the self-modification procedures effected changes in the target behaviors, a Pearson \( r \) was computed between the degree of participation scores and the improvement scores for each subject for both experiments separately and combined, yielding coefficients of -.23 (critical value at .05 level is .50) for Experiment 1, .55 (critical value is .60) for Experiment 2 and .06 (critical value is .40) for the two combined.
In Experiment 2 one subject was in an automobile accident during the third week of treatment. The measure of nail length after week two for this subject was a substantial improvement over the initial measurement (from 11/32 in. to 12/32 in.). However, the final measurement (12/32 in.) showed no further change in nail length. The subject reported that this was due to the fact that after the accident, she had stopped practicing the self-reinforcement procedures altogether. If this subject's scores are omitted from the correlational analysis, a coefficient of .64 is obtained (critical value of $r$ at the .05 level is .63). This is the only significant relationship among those discussed. It appears that the more a person practiced the procedures in which she/he were trained, the greater the success in eliminating nailbiting.

Since it was possible that the self-reliance scores of the subjects who volunteered for these self-modification projects might represent an attenuated portion of the groups they were drawn from, an $F$ test was performed to compare the variance of the self-reliance scores of the subjects with the scores of 126 college students that constituted the enrollment of two basic psychology courses. The results of this analysis showed that there were no significant differences between the two variances ($F(23, 126) = 1.3, p < .05$).
Discussion

Under conditions of the two experiments, the results indicate that there was no relationship between how much a person values his/her own opinion and his/her successful use of self-reinforcement. However, the small number of subjects actually using the self-monitoring and self-reinforcement procedures was not sufficient to substantiate or disprove the original hypothesis. Subjects must first practice the procedures involved in the self-reinforcement program before a relationship can be determined. Only four subjects in each experiment practiced the procedures to the degree that they self-monitored the entire time and self-reinforced at least in the beginning. The remaining subjects either did not participate at all or practiced the procedures to a lesser degree.

The results further indicate that no relationship existed between the subjects' degree of participation in the program and their success at self-reinforcement in Experiment 1. This relationship was evident in Experiment 2 with the omission of one subject (see the Results section for details), indicating that the more the nailbiters practiced the procedures, the greater the degree of success they obtained.

Two factors that may have affected the lack of the relationship in Experiment 1 were the differences in the behavior of the proctors and the fact that they were naive
observers. Each proctor conducted his/her discussion group differently and the opportunity for student participation varied considerably among them. At the beginning of the semester the proctors were instructed by the teacher to conduct their discussion group however they liked as long as the pertinent material was covered. This allowed individual differences in proctoring style to emerge and affect the students' opportunity for participation.

After observing each proctor in their discussion, some of these differences became apparent. Proctor 1 held three test review sessions which students could opt not to attend. There were also three post-test discussion meetings during which the questions on the test were covered. Subjects in this discussion group complained that during these sessions (which constituted half of the group meetings), there was little opportunity for discussion because one word or one sentence answers were all that was required.

In the discussion group led by Proctor 2, there was one student who monopolized the discussions. Subjects in this group complained that he greatly reduced their opportunity to participate because the proctor did not control his behavior during the discussion.

Proctor 3 encouraged discussion and thus provided numerous opportunities for participation for subjects in this group.
Due to these examples of individual style differences and others not reported here, subjects in the discussion group led by Proctor 3 could have improved more in discussion participation than subjects in groups led by Proctor 1 or 2 since their opportunity to participate was greater. This might have been remedied by standardizing the procedures for leading the discussion groups and training the proctors beforehand in these procedures.

The other problem concerning the proctors was that they did not take data reliably. Reliability scores during baseline were 98% and 100% but decreased to 88% and 82% during treatment. These percentages were derived by averaging the reliability scores for the individual subjects across proctors (see Reliability section). Individual subject reliability scores computed for observations made by Proctor 2, for example, went as low as 75%. If the proctors had been made aware of the fact that they were serving as observers in a research study, they might have been more conscientious and consistent in their data-taking. Also, sessions could have been scheduled in which the proctors would have reviewed the response definition for legitimate verbalizations and practiced recording in simulated situations.

The fact that college students represent a small, homogeneous sample may have had an effect on whether or not the relationships described above emerged in these
experiments. College students may be selected (or self-selected) in such a way that the majority of those attending college value their opinions highly, which would produce a limited range in the self-reliance scale scores. This limited score distribution would in turn affect the degree to which correlations on the above relationships could be obtained. This explanation seems feasible for these two experiments since the scores for the subjects only ranged between 136 and 177 with 80% of them being between 141 and 171 (the possible range being 20-200).

As was mentioned earlier, the two experiments presented here produced results that were inconclusive. They did not provide sufficient data with which to support or disprove the hypothesis that the more self-reliant a person is, the greater his/her success will be at self-reinforcement. In order for any potential relationship to be revealed, subjects would have to practice the self-control behaviors used, i.e., self-monitoring, graphing and self-reinforcement. These behaviors can be established in an individual only thorough the use of some kind of environmental contingencies. It can be assumed that if these self-control behaviors were already a part of a person's repertoire and were being maintained by the environment, it would not have been necessary for that person to volunteer to participate in the research. Therefore, those that did participate either needed to learn
the behaviors for the first time and/or needed environmental support for practicing them. None of this support was systematically programmed into Experiment 1. Subjects in that experiment had no contact with the experimenter during the program. In Experiment 2 there was minimal environmental support for practicing the self-control behaviors compared to a similar study by Katz, Thomas, and Williamson (in press). In that study the importance of turning in the daily self-monitoring data was stressed so that the subjects knew their records would be under close scrutiny by the experimenters. This provided external contingencies for self-monitoring. In the present study, the subjects were asked only to come in for second and third measurements but were not required to bring in their daily records. Stevens (Note 1) reported that only when subjects had to disclose their daily charts and records did their behavior change in the desired direction. Foster (1974) also suggests the use of friends to check the records and graphs while Watson & Tharp (1972) go even further in suggesting that friends dispense the reinforcers.

Other researchers advocating the use of environmental contingencies for maintaining self-control behaviors include the following. Patterson (1973) offers a technique for maintenance of self-control behaviors in the form of "booster shots" which consist of systematic environmental
contacts. Mahoney (Note 2) and Stuart and Davis (1972) support environmental planning as a major component contributing to the success of self-control procedures. Goldfried and Merbaum (1973) stress the importance of "learning" or the application of environmental contingencies in facilitating self-control.

In view of the evidence reported above, the present study should have been designed in such a manner as to provide for environmental support for the practicing of the specific self-control behaviors used. If the subjects had been reinforced for turning in their daily records and for evidence that they had engaged in the procedures, but not reinforced for success or punished for failure in behavior change, any existing relationship might have been more evident. Success or failure in using the self-control techniques could then have been related to the subjects' scores on the self-reliance scale without being obscured by their failure to practice the necessary behaviors.
Reference Notes


References


James, W. Internal vs. external control of reinforcement as a basic variable in learning theory. Unpublished Ph.D. dissertation. The Ohio State University, Columbus, 1957.


LEGITIMATE VERBALIZATIONS: Serious statements made by the subject which pertain to the topic scheduled for that week's discussion. No questions or statements concerning class formal or business should be counted; neither should a simple "yes" or "no" reply be counted.

<table>
<thead>
<tr>
<th>DATE</th>
<th>1-15</th>
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<th>31-45</th>
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APPENDIX A
Appendix B

DIRECTIONS: Read the following decision-making situations. Use this scale as a reference and place the number in the space provided that best corresponds with how you would behave.

<table>
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<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

Own opinion sometimes always
never

1. You are in a store buying an article of clothing; you like one article, and the person with you likes another. How much would you trust your own opinion over the other person's if the other person were
   - close friend
   - close relative
   - person knowledgeable about clothes
   - casual acquaintance
   - stranger

2. You are deciding what kind of car to buy; you like one kind, and the person with you likes another. How much would you trust your own opinion over the other person's if the other person were
   - close friend
   - close relative
   - person knowledgeable about cars
   - casual acquaintance
   - stranger

3. You are choosing a college to attend; you have one preference, and the person with you has another. How much would you trust your own opinion over the other person's if that person were
   - close friend
   - close relative
   - person knowledgeable about the colleges in question
   - casual acquaintance
   - stranger

4. You are deciding on what career to enter; you have one preference, and the person with you has another. How much would you trust your own opinion over the other person's if that person were
   - close friend
   - close relative
   - person knowledgeable about the careers in question
   - casual acquaintance
   - stranger
5. You are making a decision on whether to marry a particular person; you want to marry this person, and the person with you is opposed. How much would you trust your own opinion over the other person's if that person were __ close friend __ close relative __ person knowledgeable about the one you wish to marry __ casual acquaintance __ stranger

6. When I think I have done a good job at a certain task and then someone else finds fault with it, I generally stick to my original judgment if that person is __ close friend __ close relative __ person knowledgeable about the task in question __ casual acquaintance __ stranger

Read the following statement on conformity, then fill in the number in the space provided that best corresponds with your attitude. Use this scale as a reference.

1 2 3 4 5 6 7 8 9 10

weak

strong

7. If another person's opinion is different from your own, how strong does his/her opinion have to be before you change yours and conform to his/hers if that person is __ close friend __ close relative __ person knowledgeable on subject in question __ casual acquaintance __ stranger

Read the following statements and place the number that best corresponds with your opinion to the left of each statement. Use this scale as a reference.

1 2 3 4 5 6 7 8 9 10

disagree agree

__ 1. I value my own opinion highly.

__ 2. When I am talking with someone whose opinion is unlike mine, I am not afraid to differ and express my own.

__ 3. After I have made a well-thought out decision, I stick to it in the face of disagreement.
4. When working on a group project for class, I offer suggestions during the planning phase on how to produce the end product.

5. I know when something I am going to say in class discussion will be considered worthwhile by the discussion leader.

6. I feel that if my friends would do what I want them to do on the weekend, they would have a lot more fun.

7. If someone I respect expressed an opinion to which I strongly disagreed, I would state my opinion to that person even though I knew it would be unfavorably received.

8. I can always tell when I have done well on a test before it is graded by the teacher.

9. I voice my opinion at sorority, fraternity or club meetings.

10. It is hard for a friend to convince me to do something against my better judgement.

11. I argue well in my own defense when I am unjustly accused.

12. There are times when I feel I have done good work even though a teacher has given it a low grade.

Note: In the following statements the agree-disagree poles are reversed. Use this scale as a reference.

1 2 3 4 5 6 7 8 9 10

agree    disagree

13. When I am in a situation where something has gone wrong and there are several people including myself who could have been responsible, I immediately infer 'I must be the one responsible.'

14. If I am filling out a questionnaire of some sort, I always check what another person wrote down if possible before answering my own.
15. When I write a paper, I need reassurance from others that it is good before I hand it in a final draft.

16. I always ask advice before making a decision.

17. I usually go along with what my friends want to do when we are deciding where to go out to dinner.

18. After hearing what everyone else has to say in discussion, my ideas seem insignificant.

19. In arguments, I am easily won over to the opposition's side.

20. When asked for an opinion on something, my usual response is "What do you think?".