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STUDENT'S ATTRIBUTION OF SUCCESS AND SELF-PERCEPTION OF ABILITIES IN THE TEACHER-STUDENT INTERACTION

by

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Abstract

Several studies present evidence which supports the proposition that we infer our attitudes and internal states from observation of our overt behaviour and that these inferences are related to differential knowledge or attributions about the reasons for the behaviour. This proposition was examined in the teacher-student interaction from the student's point of view. Sixty subjects participated in a learning experience. Half the subjects were taught by a so called expert teacher (high-expert) and the remaining half were taught by a fellow student (low-expert). All subjects received success feed-back after the teaching period. It was expected that subjects in the high-expert condition would attribute success to the teacher more than Ss in the low-expert group. In addition it was predicted that subjects in the high-expert group would expect to do poorer on a second learning task without the help of the teacher, than subjects in the low-expert group. The results indicated that the experimental manipulation was successful in producing differential perception of teacher expertise. The two hypotheses, however, were not confirmed by the data. Several points of methodological and theoretical nature were raised, which suggest possible future avenues of research in the area of attribution in social interaction.

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Introduction

The present study was designed to examine the student's perception of the causes of successful performance after having participated in a learning situation and the way these explanations are related to the student's perception of his own ability. The question deals with whether the student attributes success to intrinsic factors such as his own ability, effort and concentration expended during learning or to external variables such as the teacher's perceived expertise during the teaching situation. An additional interest is the student's differential inferences about his abilities depending on whether the causes for success are perceived to be internal to the student or external.

The problem of perception of internal vs. external causation was examined in a study by Davison and Valins (1969). Their findings suggest that an individual's beliefs and attitudes are closely related to the type of explanations which he applies to his behaviour. In this experiment all subjects underwent a pain threshold and shock tolerance test, then they ingested a drug (actually a placebo) and repeated the shock tests with the intensities surreptitiously halved. All subjects thus believed that the drug had changed their performance; subsequently half of the subjects were told that the drug was really a placebo. Subjects in this latter group who thus attributed their increased shock tolerance to themselves perceived shocks in a third test as less painful

and tolerated more shocks than subjects who attributed their behaviour change to the drug. In other words, subjects had the same knowledge about their actual behaviour on the second series, but differing knowledge about the reasons for that behaviour. Drug subjects would assume the behaviour had an extrinsic origin, implying nothing about their actual ability to withstand shock. Placebo subjects would assume the behaviour had a more personal origin reflecting a new ability to withstand shock which led to increased ability to withstand shock on a third shock series.

Studies carried out within the cognitive dissonance framework can be reinterpreted in the light of the kind of reasons which the subjects can give to account for their behaviour. Usually in these studies subjects are subtly coerced into making a counterattitudinal statement (Festinger and Carlsmith 1959, Brehm and Cohen 1962, Brock, 1962) and it was consistently found that greater attitude change occurred when subjects appeared to be performing the new behaviour (counter-attitudinal statements) out of their own free will. When subjects believed their behaviour was under the control of external contingencies, such as monetary reward, the experimenter's request, etc... attitude change was less marked than under the previously mentioned conditions. Again, in these studies subjects performed the same behaviour but they had different reasons to account for their behaviour, which resulted in differential change of attitude.

Attribution theory is relevant to the problem of perception of causation because it deals with the causal interpretations an individual applies to his own behaviour as well as to other people's behaviour. This theory evolved from Heider's (1958) work with his book "The Psychology of Interpersonal Relations". The author described the processes and rules which govern a person's attribution of causes for the behavioural effects around him. In a recent paper Nisbett and Valins (1971) examine the causal interpretations that the individual applies to himself, using Bem's (1967) proposition as an unifying theme. Bem has proposed that individuals come to "know" their own attitudes, emotions and other internal states, partially by inferring them from observations of their own overt behaviour and/or the circumstances in which this behaviour occurs. Bem stated that, to the extent that internal cues are weak, ambigious or uninterpretable the individual is functionally in the same position as an outside observer, an observer who must necessarily rely upon those external cues to infer the individual's inner states. A study by Bandler, Madaras and Bem (1968) provides evidence for Bem's self-perception hypothesis, i.e., that we get to know our internal states by inferring them from observations of our own overt behaviour. The authors found that subjects rated shocks as significantly more uncomfortable when they escaped them than when they endured them. Presumably escape from shock indicated that the shock is strong and painful and needs to be escaped, whereas if the subjects endured shock they might have inferred that the pain was

not strong enough to terminate it. However, subjects had to perceive that they had some choice in the matter. When subjects were made to either endure or escape the shock, they did not infer pain from escape behaviour and absence of pain from no-escape behaviour. This qualification leads to an important question: When will individuals infer their internal states from observations made about their overt behaviour, and when will they assume that their overt behaviour does not indicate anything significant about their internal state?

Nisbett and Valins (1971) attempted to define the type of situations in which an individual will use his own overt behaviour to make inferences about his internal state. According to the authors people seem to infer their beliefs from their behaviour only when they have good reasons to believe that their behaviour toward a stimulus is produced primarily by their feelings about the stimulus, which the authors call "stimulus attribution". A belief inference related to the behaviour will not take place when the person has reasons to believe that his behaviour toward the stimulus was produced in large part by circumstantial factors extrinsic to the stimulus, this would result in "circumstance attribution".

The distinction between stimulus and circumstance attribution is not equivalent to Kelley's (1967) "internal-external" dimension which is concerned with the causal role of the person vs. the causal role of the environment. Circumstance and stimulus attributions deal

with the allocation of causes between various aspects of the environment, being thus an expansion of Kelley's external category. For example, the shock is a constant stimulus across both conditions in the Davison and Valins study. In one of the conditions (informed placebo condition) subjects attributed their behaviour toward the shock stimulus, to their reactions to the shock itself, while in the other condition (uninformed placebo condition) behaviour was attributed to the particular circumstance under which they were exposed to the shock, that is to the effects of a drug which is supposed to increase tolerance to shock. Both causes are "external" but it made a difference which external, situational factor was perceived as causal.

So far evidence was presented which supports the proposition that we infer our attitudes from our overt behaviour and that these inferences are related to differential knowledge or attributions about the reasons for the behaviour. It is felt that the foregoing discussion is relevant to the teaching situation in which one person, the teacher, attempts to produce change in another person, the student. In this situation both the teacher and the student can search for explanations which might account for any improvement or lack of improvement in the student's performance. The teacher can attribute improvement to his own teaching ability or to the student's ability to learn. The student in turn can attribute improvement to his own ability or to the teacher's ability to teach.

Several studies deal with attribution of causality in the teaching situation, but all of them focussed on the teacher's attribution. Ross, Bierbrauer and Polly (1971) conducted a study in which professional teachers and college students attempted to teach an 11 year old boy the spelling of commonly misspelled words. Participants tended to rate "teacher factors" as being more important in success than in failure conditions. This pattern of attribution was considerably more pronounced for professional teachers than for college students. It is possible that the results of this study are partly explained by the fact that teachers did not receive information on the initial level of ability of the student. If the teacher believed that the student's initial level of abilities was high then he might have been more likely to attribute student's failure to himself. Schopler and Layton (1972) examined teacher's attributions for initial low ability and high ability students. They used a situation of interpersonal influence and found that teachers rated themselves as more influential when a high-ability target failed than when he succeeded, and more influence was attributed when a low ability target person succeeded than when he failed. These studies indicate that the student's level of success as well as his initial level of abilities affect the teacher's perception of the degree of influence he had over the student's performance. No studies were found which deal with the student's perception of causality in the teaching situation.

The present study deals with the student's perception of causes of his performance and with the student's beliefs about his abilities, i.e., will the student make inferences about his internal state of abilities based on his successful performance? It was mentioned earlier that according to Nisbett and Valins (1971) a person will infer his internal state from observation of his overt behaviour when he has made a stimulus attribution. No belief inference will take place if the subject makes a circumstance attribution. If one analyzes the teacher-student relationship one could say that the latter is exposed to two sets of stimuli. First there is the learning material and second there is the teacher. The student could attribute his successful performance to his intrinsic reaction to the learning material, i.e., his ability to understand the material, or to the circumstantial stimulus which is the teacher and the way in which he presents the learning material. If the student perceives his performance as having been caused by the teacher's expert teaching techniques rather than by his own ability to cope with the learning material, then he might not infer that the performance reflects his internal ability.

The problem was analyzed in a learning situation where the subject learned a mental maze which required him to remember a sequence of numbers. The experimental design contained two levels of teacher expertise, low-expert and high-expert. In the low-expert situation one student taught another student the task. In the high-

expert condition the experimenter taught the task. The experimenter conveyed to the subject that she was an expert in behaviour modification. She told him that she knew exactly how to manipulate reward and punishment contingencies to produce maximum learning. In order to control for the subjects' initial expectation about their performance on the mental maze they were given a short test before learning the mental maze. This test was supposed to provide a base-rate from which improvement was going to be evaluated, and all subjects were told that their performance was below average. After that, subjects learned the mental maze and all were told that their performance was above average. Then half of the subjects in each group were asked to answer a questionnaire which investigated their explanations for their performance on the mental maze. The remaining subjects in each group were asked to estimate how well they thought they would perform without the help of the teacher on a task which depended on the same type of skills which were required to learn the mental maze. After their estimate the subjects worked on the second task.

Information about the subject's attribution about success on the mental maze and estimate about future performance data were collected from two separate groups of subjects because they might have become suspicious of the purpose of the experiment after having answered the attribution questionnaire. If this was the case then it would have been difficult to determine whether the subject's prediction of future success was a result of having answered the questionnaire or

a result of the learning experience.

The hypotheses investigated in the present study are as follows:

1) that the high-expert condition would be more conducive to external, teacher attributions, than the low-expert situation. Three reasons could be given if this prediction was not supported by the experimental data. (a) The manipulation was not credible to the subjects and they did not believe that the instructor was an expert in behaviour modification. In order to control for this possibility a post-experimental questionnaire was given to the subjects which inquired about the impressions of the instructor's expertise. (b) The pre-experimental manipulation was not successful in making subjects believe they would not perform well on the mental maze. If this was the case then the subject would not need to search for an explanation for his successful performance because he felt he had the ability to do well on this task to begin with. For this reason subjects were asked after the learning situation how well they had expected to perform on the mental maze. Also subjects were given a fourth alternative explanation on the attribution questionnaire, which required them to state how good they felt they were at this type of task. (c) Finally, it could be possible that the expert instructor is not perceived as an external controlling contingency in this type of learning situation. Rather, the instructor could be perceived by the student as a source of information, and whether this information was presented in an expert or non-expert manner is irrelevant to the

learning process. To obtain information about this point, subjects were asked to give reasons to explain their performance on the mental maze, before they rated the 4 alternative explanations presented by the experimenter.

2) That subjects in the high-expert condition would expect to do poorer on a second related learning task without the help of the teacher, than subjects in the low-expert group. This prediction was based on the assumption that subjects in the high-expert condition would attribute their success to the teacher. This would preclude the subject from making inferences about his abilities based on observation of his overt behaviour, i.e., success performance. If he now has to perform in a similar situation, but without the help of the instructor he should predict that he will do worse than in the first situation.

Experiment

Subjects.

60 Subjects (Ss), from two different types of student populations participated in the study, (University students and grade 12 High School students). 33 Ss were male and female students attending Summer School at the University of Victoria, British Columbia. They were taking courses in various fields such as Geography, History, English and Mathematics. The remaining 27 Ss were male and female grade 12 students from Belmont Senior Secondary School in Sooke, British Columbia.

Apparatus and Materials.

A learning apparatus similar to the one used by Lykken (1955) was employed. It consisted of a black 18" x 16" x 11" wooden cabinet. The panel which faced the student S displayed 4 switches numbered 1 to 4 and a red and white pilot light above each switch. The back panel of the cabinet had 4 lights which indicated to the teacher which switch the S had depressed and 8 switches which were connected to the pilot lights on the student S's panel.

The "Digit Symbol" subtest of Wechsler's Adult Intelligence Scale was used for the second learning task. (See Appendix I).

Procedure.

Learning phase: Ss were randomly assigned to the 2 experimental conditions: Group I (high-expert instructor) and Group II (low-expert instructor). In Group I (n=30) Ss were informed that the experimenter (E) was an expert in behaviour modification techniques and that she was going to teach a task. The instructions were approximately like the following:

"This is a learning experiment, and you will have to learn a task. In this study I am interested in finding out how effective behaviour modification techniques are in helping people to learn. Now, before we continue, do you know what I mean by behaviour modification techniques?" (If subjects answered yes, they were told that the definition was going to be reviewed very briefly). "Behaviour modification technique refers to a method of teaching which has been investigated in Psychology. Researchers have been interested in finding out what goes on when people learn and they have found that learning takes place by systematic and specifiable rules. Behaviour modification techniques take advantage of these rules in producing optimal conditions for learning. We produce the best conditions for learning by varying reward and punishment in certain ways. In this study you will have to learn a task which is called a mental maze. I have studied this maze very carefully and have taught it to many people. I have found that I can help people learn this task by changing the length of these red and white lights

in a certain way. Now I'll explain the task to you, but before we go on, do you have any questions so far?"

In Group II (low-expert) one S taught another S the mental maze. A coin was tossed to assign the Ss to either the teacher or the student role. Instructions were worded more or less like the following: "This is a learning experiment and one of you will have to teach the other person. In this study I am interested in finding out how effective behaviour modification techniques are in helping people to learn. (At this point Ss received an explanation about behaviour modification techniques which was similar to the one given in Group I). Now, in this study you will have to learn a mental maze and you will use this apparatus here. Before I go on to explaining the mental maze, do you have any questions so far?"

Following this introduction the E explained the mental maze to the S. Instructions for the high-expert group were as follows: "This apparatus here is called a mental maze. This mental maze has ten positions; these are the positions you have to keep in your mind and that's why it is called a mental maze. Each of these 10 positions contains one of these 4 numbers which you can see above the switches. For example, the first position could contain #3, the second position #1, the third position #4 and so on (The E drew a diagram to explain the mental maze). I have made up a sequence similar to this one and

your task is to find out which number goes in each position. You do this by pressing any of these 4 switches. Ok, now you pressed that switch. Let's suppose it was the wrong number. In this case I give you a red light, the red light means that your response was wrong. Now try the number for the second position. You pressed that number, let's assume that it was correct. Now you get a white light, this means you made the right response and it's like a symbolic reward. Now you know that this number is in the second position, and whenever you come to the second position you will press that switch. You go on doing this for each of the 10 positions and we will go through the same sequence 12 times or until you have learned it, whichever comes first. At first you will be guessing, but the second time through you have to try and remember which number belongs to each position. Do you have any questions?"

For Group II the instructions were the same as for Group I, with the exception of the directions which were given to the teacher-S.

"Your task is to let him/her know whether he/she made a correct or incorrect choice. These switches here will turn the red lights on and these the white lights. I want you to vary the length of these lights to help him/her learn. Just use your intuition and keep the lights on longer or shorter in a way than you think will help him/her learn. Here is the list of numbers which he/she has to learn and

you just make a mark on the sheet which tells if the response was right or wrong. Do you have any questions?"

Base-rate measurement: Following the instructions about the mental maze all student-Ss participated in short test of "memory for numbers". This test was supposed to give the E a base rate from which she could evaluate the S's improvement. The instructions were approximately as follows:

"Before we go ahead with the learning task we need to know how good you are at remembering numbers, so that we can see how much you have improved on the mental maze. We will do the following, I will present to you a sequence of 15 digits containing the numbers from 1 to 4, over the white lights on the panel of the mental maze. I want you to watch very carefully and after I have presented the 15 numbers you have to try and reproduce the sequence as well as you can using these switches. You probably won't remember all the numbers the first time around, but just try your best. Then I'll present the sequence to you again and you'll have to reproduce it again with the switches. After the second trial I will count how many numbers you got correct and this will give us the base-rate. Do you have any questions before we begin?"

After the instructions the E presented the 15 digits at the rate of one number per second. After the second presentation E

counted how many correct choices the S had made and rated his performance on a seven point scale. All Ss were told that compared to a group of people who done this test, their performance was below average. The E presented the S with a seven point scale printed on a sheet of paper and said:

"If we were to grade your performance on this seven point scale where "1" is poor, "4" is average and "7" is excellent; compared to a group of people who have done this task your performance was below average and it would be about a "2".

The E made a cross on #2 of the scale, and then she briefly explained the mental maze again.

"Now I will teach you the mental maze. Remember, the mental maze has 10 positions and each position has one of the numbers from 1 to 4. A red light means you made a mistake, a white light means that you were right. I will change the length of the lights to help you learn (Group I). You change the lights to try and help him/her learn (Group II)".

The student S was taught the task by the E (Group I) or by the teacher-S (Group II). The sequence of correct numbers was determined in a random manner but was held constant over trials and for all Ss. All Ss understood the nature of the task and were able to get at least 6 correct answers on the 12th trial.

Feed-back on Performance: After completion of the learning task all Ss were told that their performance was above average. They were presented with a 7 point scale and their performance was rated at number 6.

Attribution of success: Following the feed-back on performance half of the Ss in each group answered a questionnaire in which they had to rate statements on a 7 point scale as to how much they felt that reason explained their performance on the mental maze. The statements represented different explanations which could have accounted for their successful performance on the mental maze. They made reference to personal and external causation as well as to chance elements and past experience. The questionnaire also contained other questions to investigate the S's perception of the teacher and of the experiment (See Questionnaire, Appendix II).

Prediction of success: The remaining 15 Ss in each Group I and Group II who did not answer the attribution questionnaire were told that they would have to participate in one more short learning task, which was described to them in the following way:
"Now you will have to participate in one more short learning task which depends on the same abilities which you applied in learning the mental maze. It is more or less described on this sheet here. You see, here at the top we have the positions again, but now we have 9

instead of 10. Each of these positions has a different symbol instead of a number as before. Down here we have the numbers from 1 to 9 again, but the symbols are missing. You have to fill in the symbols which belong to each number. I will give you 30 seconds to study the numbers and the symbols and then I will give you 90 seconds to fill in the symbols. Fill them in, in the given order, don't skip any numbers. You will be able to look at the top row whilst you are working, but because this is a speed test, the more symbols you remember the less you have to look up and the better you will do. Do you have any questions about this task?"

Following these instructions Ss were handed a sheet of paper with printed instructions and normative data for the learning task. The instructions were as follows:
"The scale at the bottom of this sheet gives you some idea of how many symbols have to be filled in to obtain an average score, below average score and above average score. Please examine the scale very carefully and then make a mark on the 7 point scale according to how well you think you will do on this task" (See Appendix III).

After S made his estimate of how well he thought he would do, he was given 30 seconds to study the numbers and the symbols. Then he was given 90 seconds to work on the task. Following completion of the task he was asked to fill in a questionnaire which inquired into his perception of the two learning tasks (See Appendix IV).

All Ss were debriefed about the study at the end of the experiment.

Results

Verification of experimental manipulation: The mean ratings and S.D. for the Ss' expectation of success on the mental maze in both experimental groups are presented in table I. As expected Ss rated the teacher in the high-expert condition as significantly more expert than they rated the teacher in the low-expert group ($t=9.37$, $d.f.=28$ $p<.005$). In addition, Ss in both high and low-expert groups expected to perform below average on the mental maze. The difference between the average expectation scores was non-significant. ($t=.103$, $d.f.=28$)

Table I. Perceived teacher expertise scores* and expectation about performance on the mental maze for high-expert and low-expert conditions.

		Low Expert (n=15)	High Expert (n=15)
How expert did the instructor appear to you?	$\bar{x}$	3.24	6.33
	S.D.	1.32	0.61
How well did you expect to do on the mental maze after the initial test?	$\bar{x}$	3.13	3.26
	S.D.	1.18	1.27

* where highest rating = 7

Attribution of causality: The mean ratings and S.D. for the 4 attribution alternatives for low and high-expert Ss are presented in table 2. It was hypothesized that Ss in the low-expert group would

attribute success to their own effort to a significantly greater extent than Ss in the high-expert group. The null hypothesis of no difference between means was tested. No significant differences were found between self-attribution ratings of high-expert and low-expert Ss. (t= .17, $d.f.$= 28, n.s.)

Table 2. Mean ratings and S.D. of subject's attribution of success in low and high-expert conditions.

			High-Expert	Low-Expert
1.	I have always been good at this type of task.	$\bar{x}$	3.53	3.73
		S.D.	1.45	1.27
2.	I put a lot of effort and concentration into learning the mental maze.	$\bar{x}$	5.3	5.13
		S.D.	1.11	1.06
3.	The instructor taught me the task very well and timed the reward so that I could learn better.	$\bar{x}$	3.9	5.8
		S.D.	1.89	1.08
4.	I was just lucky to get the right answer.	$\bar{x}$	3.36	3.2
		S.D.	1.54	1.52

A second hypothesis predicted that the high-expert Ss would rate the teacher's influence on their successful performance as greater than Ss in the low-expert group. This hypothesis, however, was not confirmed (t= 1.19, $d.f.$= 28, n.s.)

No significant differences between groups were observed in the Ss' perception of chance as cause for their performance (t= .101, $d.f.$= 28, n.s.)

The difference between groups of Ss' ratings to the statement "I have always been good at this type of task" was found to be non-significant (t= .14, d.f. 28, n.s.)

Expectation of future success: It was predicted that Ss in the low-expert condition would expect to perform better on the second task than Ss in the high-expert group. The mean prediction of success scores and the S.D. are presented in table 3. The results did not support this prediction. (t= .1376, $d.f.$= 28, n.s.).

Table 3. Prediction of success on a second task in low and high-expert groups.

		Low-Expert	High-Expert
Prediction of success	$\bar{x}$	4.433	4.33
	S.D.	0.6629	0.8193

Discussion

The objective of this study was to examine the student's perception of internal vs. external control of his behaviour and it's relation to self-perception of abilities in the teaching situation. It was hypothesized that Ss in the low-expert group would attribute success to their own effort to a greater extent than Ss in the high-expert group, and that high-expert Ss would rate the teacher's influence on their performance as greater than Ss in the low-expert group. (Hypothesis I) In addition it was predicted that Ss in the low-expert condition would expect to perform better on the second task than Ss in the high-expert group. (Hypothesis II)

The results indicate that the experimental manipulation was successful in producing the desired effects on perception of teacher's expertise. Ss did believe that the instructor in one condition was more expert than the instructor in the second condition. In addition, all Ss expected to perform below average on the first learning task, thus starting with comparable expectation levels about success.

The two hypotheses, however, were not supported by the data. The differential perception of teacher's expertise did not result in the predicted differences in the student's perception of causes for their performance. Ss in the high-expert condition did

not rate the teacher's contribution as more important than Ss in the low-expert group. In addition no differences in attribution to self were observed between both groups. With regard to the second hypothesis it was found that the Ss' perception of their own ability did not differ significantly from the low-expert to the high-expert condition. Subjects in both groups tended to converge on the average range of the seven point success-failure rating scale.

The lack of support for the second hypothesis is not surprising in view of its being contingent upon the first hypothesis. It was expected that Ss would make differential inferences about their abilities depending on whether they perceived the cause of their performance to be internal or external. However, as no differences in attribution were obtained, the basis for the second prediction was absent. The results suggest that the manipulation of perceived teacher expertise did not differentially succeed in changing the Ss' perception of their own abilities. It was also observed that Ss tended to interpret the request to estimate their future success in different ways. Most of them seemed to be reluctant to evaluate themselves. It also was observed that Ss interpreted the request in a more general sense, as if they were asked "How intelligent do you think you are?" (Some comments made by Ss which illustrate this point were, for example: "I have always been an average student, so I guess, I'll be average"; "Do you want to know if I'm on an ego-trip?"; "Ok, I'll be conceited and rate myself

above average.") It is possible that some of these difficulties might have been reduced if Ss had been told that the purpose of the estimate was to see how accurately they could predict their success rather than to see how able or intelligent they thought they were. This approach might be helpful in self-perception studies which require the S to make an evaluative statement about himself.

The first hypothesis was formulated on the basis of external contingency manipulations, i.e., degree of teacher expertise, but this manipulation did not succeed in producing the predicted attributional differences. One of Kelley's (1971) assumptions about attribution of causality is felt to be related to the first hypothesis and it's outcome. According to Kelley:

> "Attribution processes are to be understood not only as a means of providing the individual with a veridical view of his world, but as a means for encouraging and maintaining his effective exercise of control in that world... His latent goal in gaining knowledge is that of effective management of himself and his environment. He is not a pure scientist, but an applied one." (p.22)

If one accepts Kelley's notion of the person as an applied scientist then the results of the present study could be viewed in a different light. If the individual needs to control his environment he needs to learn about it. Increasing knowledge and increasing skill would widen the individual's scope of control. In the present

study Ss might not have attributed success to the manipulations of the expert teacher more than to themselves because this would imply that they would lose control in similar circumstances unless the teacher was present. However, even though this is a plausible explanation it is only speculative since it is not known how important in terms of "future control" the learning situation was to the Ss.

Ross, Bierbrauer and Polly (1971) reported findings which might be interpreted in the light of the foregoing discussion. They found that the trend of attributing success to student factors and failure to teacher factors was more pronounced for professional teachers than for college students. It is possible that the latter thought that their teaching ability was being evaluated by the student's success or failure rate and this "apprehension" might have lead them to attribute failure to the student to a greater extent than the professional teachers did. This study, however, provides only indirect support for the notion that perception of consequences of behaviour could affect a person's attribution. A study by Walster (1966) provides more direct evidence for this proposition. She found that manipulations of the perceived consequences of behaviour (serious or minor harm to another) resulted in differential perception of the causes of behaviour (criminal negligence vs. forgivable thoughtlessness). Walster's study however, dealt with observer's attribution of causality. It would be

interesting to examine these attributional differences from the actor's point of view.

The foregoing discussion suggests that the analysis of the attribution process is more complex in a situation of social interaction than in a setting where an individual responds to non-personal, environmental forces, as for example, in the Davison and Valins (1969) study. In this latter situation the temporal sequence between cause and effect was presented in a fairly clear cut manner. Ss ingested a drug and subsequently observed an increase in shock tolerance. It was fairly easy for Ss to attribute behaviour change to the immediately preceding event, i.e., ingestion of a drug. The temporal cause-effect sequence in the learning situation, however, is not that easily identifiable. The student does observe a change in performance but this change is gradual. It can be viewed as the end result of an ongoing give and take between teacher and student. In this type of interaction the student can view himself as being influenced by the teacher, but he also sees himself responding, which in turn elicits a new response in the teacher.

In such an interaction situation where the cause and effect relationship is ambiguous, attributions might be particularly susceptible to influences by motivational factors much in the same way that perception of ambiguous stimuli is susceptible to Ss' motives, expectations,

etc. (Bruner and Goodman, 1947; Hastorf and Cantril, 1954). However, very little attention has been paid to motivational factors in the attribution literature. Jones and Nisbett (1971) in their paper on differential actor-observer attribution processes briefly mention the role of motivational factors, but tend to emphasize the role of cognitive factors. They state:

> "We have emphasized -perhaps overemphasized- the role of cognitive and perceptual factors in developing our major theme. We have argued that both actors and observers are concerned with processing useful information and suggested that action cues and situation cues are utilized differentially by them. We would now like to acknowledge that motivational factors may often serve to exaggerate the broad tendencies that we tried to describe. At the same time, however, we would also like to express the opinion that motivational factors may often mute those tendencies". (pp. 14-15)

Contrary to Jones and Nisbett's opinion the present study suggests that it might be perhaps simple minded to consider attribution primarily a cognitive matter. It is felt that in conditions where the temporal cause-effect relationships are more ambiguous, the purely logical inferences could be more easily affected by motivational aspects. For example, if one considers a situation of group decision making, it would be interesting to examine the participant's perception of their own contribution toward the final decision if the outcome is positive or negative. It is possible that a person would tend to blame a poor

outcome on other group members, while taking personal credit for a good outcome.

One point of theoretical relevance was raised by this study and it refers to the question: "Do people attempt to explain their behaviour?" In the present study Ss were asked if they had attempted to explain their successful performance, and 17 out of 30 Ss answered "no". This finding suggests that individuals do not always search for explanations of their behaviour, or at least they are not aware of it. It also questions the validity of inferring mediating attributions rather than measuring them explicitly. Many studies reported in the attribution literature are primarily concerned with other dependent variables, and only incidentally with attributions (Storms and Nisbett 1970, Davison and Valins 1968, Festinger and Carlsmith 1956, Bogart, Loeb and Rutman 1969). If the finding of the present study holds for other situations it seems necessary to collect explicit information about attributions. Otherwise it is possible that a process other than attributions might have been responsible for the changes in the dependent variable. The method for collecting explicit attribution data used in this study was found to be valuable. By collecting attribution data from one group of Ss and self-perception information from another group, one avoids the problem of sensitizing the latter group to the hypothesis of the experiment.

It also might be useful to identify the conditions in which individuals will seek to explain their behaviour. One possibility is that people are more likely to search for reasons for their behaviour if the event is unusual and does not fit into the general pattern of behaviour. If one applies this notion to the results of this experiment, it is possible that some Ss did not attempt to explain their performance because success in a learning experience did not constitute an unusual event for them. This explanation, however, is purely speculative since the Ss were not grouped into different levels of past academic achievement, which could have given some indication about the Ss' past pattern of success. A more direct way of testing for this notion could be carried out by manipulating the frequency of occurrence of a certain event. For example, a group of Ss could be taught a certain task and after the initial learning period all Ss would receive fairly consistent feed-back of success. In the second stage, half of the Ss would shift to a failure pattern and the other half would continue with success feed-back. Following this experience a measure could be taken of the extent to which Ss had attempted to explain their performance. I would be predicted that more Ss in the first than in the second condition would answer the question affirmatively.

In conclusion, the present study was designed to examine attributional processes from the student's point of view in the student-

teacher interaction. The predicted attributional and self-perception differences were not obtained, but several points of methodological and theoretical nature were raised which could suggest possible future avenues of research in the area of attribution in social interaction. Procedures were suggested which could be used to collect explicit attribution and evaluative self-perception data. The importance of including motivational aspects in the analysis of the attribution processes was discussed. In addition, the desirability of obtaining explicit information about Ss' attributions, rather than inferring them, was pointed out.

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WISC RECORD FORM

NAME_____ AGE____ SEX____

ADDRESS_____

PARENT'S NAME_____

SCHOOL_____ GRADE_____

REFERRED BY_____

	Year	Month	Day
Date Tested			
Date of Birth			
Age			

	Scaled Score	IQ
Verbal Scale		
Performance Scale		
Full Scale		

*Prorated if necessary

	Raw Score	Scaled Score
VERBAL TESTS		
Information		
Comprehension		
Arithmetic		
Similarities		
Vocabulary		
(Digit Span)		
Sum of Verbal Tests		
PERFORMANCE TESTS		
Picture Completion		
Picture Arrangement		
Block Design		
Object Assembly		
Coding		
(Mazes)		
Sum of Performance Tests		

NOTES

_____

Examiner

Printed in U. S. A. The Psychological Corporation, 70-260 AS

1. INFORMATION	Score 1 or 0		Score 1 or 0		Score 1 or 0
1. Ears		11. Season—Year		21. Pounds—Ton	
2. Finger		12. Color—Rubies		22. Capital—Greece	
3. Legs		13. Sun—Set		23. Turpentine	
4. Animal—Milk		14. Stomach		24. New York—Chicago	
5. Water—Boil		15. Oil—Float		25. Labor Day	
6. Store—Sugar		16. Romeo—Juliet		26. South Pole	
7. Pennies		17. Fourth—July		27. Barometer	
8. Days—Week		18. C.O.D.		28. Hieroglyphic	
9. Discoverer—America		19. American—Man		29. Genghis Khan	
10. Things—Dozen		20. Chile		30. Lien	

2. COMPREHENSION	Score 2, 1 or 0
1. Cut—Finger	
2. Lose—Balls (Dolls)	
3. Loaf—Bread	
4. Fight	
5. Train—Track	
6. House—Brick	
7. Criminals	
8. Women—Children	
9. Bills—Check	
10. Charity—Beggar	
11. Government—Examinations	
12. Cotton—Fiber	
13. Senators	
14. Promise—Kept	

3. ARITHMETIC			
Problem	Response	Time	Score 1 or 0
1. 45"			
2. 45"			
3. 45"			
4. 30"			
5. 30"			
6. 30"			
7. 30"			
8. 30"			
9. 30"			
10. 30"			
11. 30"			
12. 60"			
13. 30"			
14. 60"			
15. 120"			
16. 120"			

4. SIMILARITIES	Score 1 or 0
1. Lemons—Sugar	
2. Walk—Throw	
3. Boys—Girls	
4. Knife—Glass	
5. Plum—Peach	Score 2, 1 or 0
6. Cat—Mouse	
7. Beer—Wine	
8. Piano—Violin	
9. Paper—Coal	
10. Pound—Yard	
11. Scissors—Copper Pan	
12. Mountain—Lake	
13. Salt—Water	
14. Liberty—Justice	
15. First—Last	
16. 49—121	

SUPPLEMENTARY TESTS

DIGIT SPAN

Digits Forward	Score (Circle)	Digits Backward	Score (Circle)
3-8-6	3	2-5	2
6-1-2	3	6-3	2
3-4-1-7	4	5-7-4	3
6-1-5-8	4	2-5-9	3
8-4-2-3-9	5	7-2-9-6	4
5-2-1-8-6	5	8-4-9-3	4
3-8-9-1-7-4	6	4-1-3-5-7	5
7-9-6-4-8-3	6	9-7-8-5-2	5
5-1-7-4-2-3-8	7	1-6-5-2-9-8	6
9-8-5-2-1-6-3	7	3-6-7-1-9-4	6
1-6-4-5-9-7-6-3	8	8-5-9-2-3-4-2	7
2-9-7-6-3-1-5-4	8	4-5-7-9-2-8-1	7
5-3-8-7-1-2-4-6-9	9	6-9-1-6-3-2-5-8	8
4-2-6-9-1-7-8-3-5	9	3-1-7-9-5-4-8-2	8

F____ + B____ = ____
Highest numbers circled

MAZES

Maze	Max. Errors	Errors	Score
A. 30"	2		0 1 2
B. 30"	2		0 1 2
C. 30"	2		0 1 2
1. 30"	3		0 1 2 3
2. 45"	3		0 1 2 3
3. 60"	5		0 1 2 3
4. 120"	6		0 1 2 3
5. 120"	8		0 1 2 3

Notes:

	Score 2 or 0	5. VOCABULARY
1. Bicycle		
2. Knife		
3. Hat		
4. Letter		
5. Umbrella		
	Score 2, 1 or 0	
6. Cushion		
7. Nail		
8. Donkey		
9. Fur		
10. Diamond		
11. Join		
12. Spade		
13. Sword		
14. Nuisance		
15. Brave		
16. Nonsense		
17. Hero		
18. Gamble		
19. Nitroglycerine		
20. Microscope		
21. Shilling		
22. Fable		
23. Belfry		
24. Espionage		
25. Stanza		
26. Seclude		
27. Spangle		
28. Hara-Kiri		
29. Recede		
30. Affliction		
31. Ballast		
32. Catacomb		
33. Imminent		
34. Mantis		
35. Vesper		
36. Aseptic		
37. Chattel		
38. Dilatory		
39. Flout		
40. Traduce		

6. PICTURE COMPLETION

	Score 1 or 0
1. Comb	
2. Table	
3. Fox	
4. Girl	
5. Cat	
6. Door	
7. Hand	
8. Card	
9. Scissors	
10. Coat	
11. Fish	
12. Screw	
13. Fly	
14. Rooster	
15. Profile	
16. Thermometer	
17. Hat	
18. Umbrella	
19. Cow	
20. House	

7. PICTURE ARRANGEMENT

Arrangement		Time	Order	Score
A. Dog	75"	1 / 2		0 · 1 ABC · 2 ABC
B. Mother	75"			0 · 1 OYT · 2 TOY
C. Train	60"			0 · 1 IR ON · 2 IRON
D. Scale	45"			0 · 2 ABC
(Fight)				
1. Fire	45"			0 · 4 · 11-15 · 5 · 6-10 · 6 · 1-5 · 7 — FIRE
2. Burglar	45"			0 · 4 · 11-15 · 5 · 6-10 · 6 · 1-5 · 7 — THUG
3. Farmer	45"			0 · 4 · 11-15 · 5 · 6-10 · 6 · 1-5 · 7 — QRST OR SQRT
4. Picnic	45"			0 · 4 · 11-15 · 5 · 6-10 · 6 · 1-5 · 7 — EFGH OR EFHG
5. Sleeper	60"			0 · 4 · 16-20 · 5 · 11-15 · 6 · 1-10 · 7 — PERCY
6. Gardener	75"			0 · 4 · 21-30 · 5 · 16-20 · 6 · 1-15 · 7 — FISHER OR FSIHER
7. Rain	75"			0 2 MSTEAR ASTEMR · 4 · 21-30 · 5 · 16-20 · 6 · 1-15 · 7 — MASTER

8. BLOCK DESIGN

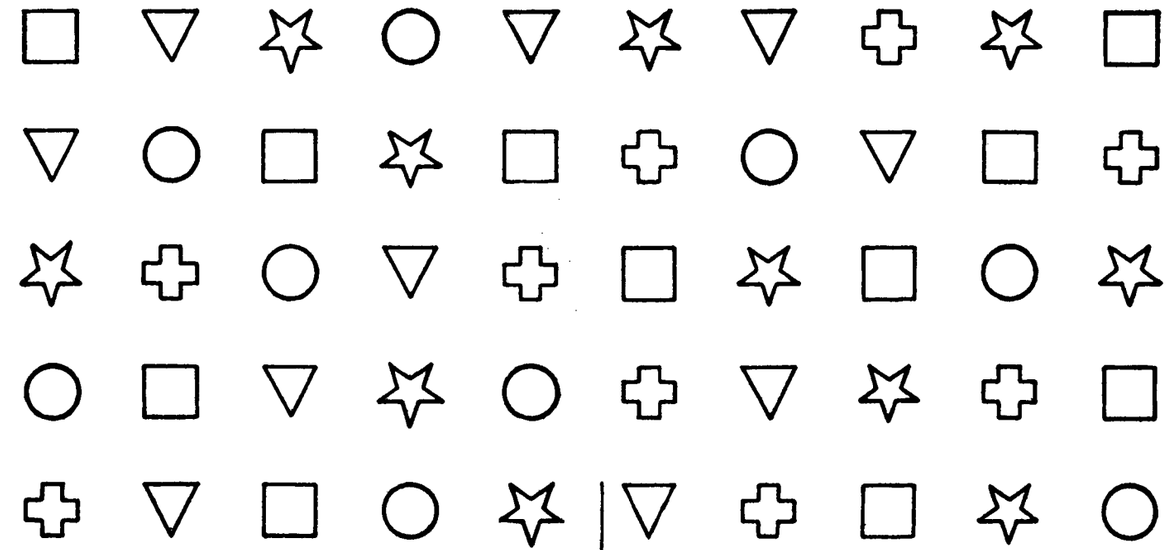
Design	Time	Pass-Fail	Score
A. 45"	1 / 2		2 / 0 1
B. 45"	1 / 2		2 / 0 1
C. 45"	1 / 2		2 / 0 1
1. 75"			0 · 21-75 · 4 · 16-20 · 5 · 11-15 · 6 · 1-10 · 7
2. 75"			0 · 21-75 · 4 · 16-20 · 5 · 11-15 · 6 · 1-10 · 7
3. 75"			0 · 26-75 · 4 · 21-25 · 5 · 16-20 · 6 · 1-15 · 7
4. 75"			0 · 21-75 · 4 · 16-20 · 5 · 11-15 · 6 · 1-10 · 7
5. 150"			0 · 66-150 · 4 · 46-65 · 5 · 36-45 · 6 · 1-35 · 7
6. 150"			0 · 81-150 · 4 · 66-80 · 5 · 56-65 · 6 · 1-55 · 7
7. 150"			0 · 91-150 · 4 · 66-90 · 5 · 56-65 · 6 · 1-55 · 7

9. OBJECT ASSEMBLY

Object	Time	Score
Manikin 120"		0 · 1 · 2 · 3 · 21-120 · 4 · 16-20 · 5 · 11-15 · 6 · 1-10 · 7
Horse 180"		0 · 1 · 2 · 3 · 4 · 5 · 31-180 · 6 · 21-30 · 7 · 16-20 · 8 · 1-15 · 9
Face 180"		0 · 1 · 2 · 3 · 4 · 5 · 71-180 · 6 · 46-70 · 7 · 36-45 · 8 · 1-35 · 9
Auto 180"		0 · 1 · 2 · 3 · 4 · 5 · 46-180 · 6 · 31-45 · 7 · 26-30 · 8 · 1-25 · 9

Notes:

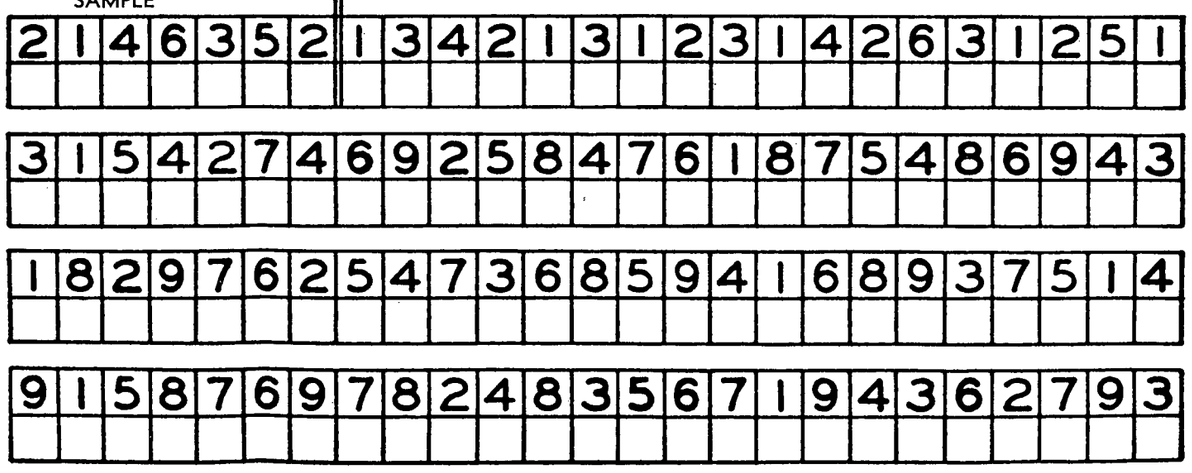
TIME (120") _____ NO. RIGHT _____ SCORE _____



CODING A
(5-7)

CODING B
(8-15)

SAMPLE



TIME (120") _____ SCORE (NO. RIGHT) _____

APPENDIX II

Questionnaire

1. Which are the reasons that you could give that explain your performance on the mental maze. Explain briefly.

The following statements represent various reasons which could have caused your performance on the mental maze. Please read each statement carefully and make a mark on the seven point scale beside each one of them as to how much you feel that particular reason is applicable.

1. - I have always been good at this type of task.

1....2....3....4....5....6....7..
/ definitely no / definitely yes

2. - I put a lot of effort and concentration into learning the mental maze.

1....2....3....4....5....6....7
/ definitely no / definitely yes

3. - The instructor taught me the task very well and timed the reward so that I could learn better.

1....2....3....4....5....6....7
/ definitely no / definitely yes

4. - I was just lucky to get the right answer.

1....2....3....4....5....6....7
/ definitely no / definitely yes

1. - Had you attempted to find reasons for your improvement on the mental maze before you were explicitly asked about it?

Yes No

2. - On the following seven point scale rate, how expert the instructor appeared to be to you.

1....2....3....4....5....6....7
not expert — average — highly expert

3. - How well did you expect to do on the mental maze after the initial test?

1....2....3....4....5....6....7
poorly — average — excellent

4. - Did you feel that the base rate measurement was an adequate reflection of your ability to perform on the mental maze at that time?

Yes No

5. - If your answer was "no" to the previous question, state why you thought that your performance on the base rate measurement did not reflect your actual ability at that time.

6. - Did you think that the behaviour modification techniques used by the instructor were in large part responsible for your improvement?

Yes No

7. - If you answered "yes" to the previous question, do you feel that you have learned the maze and that you are now able to do well on your own on the mental maze?

Yes No

APPENDIX III

Post-Experimental Questionnaire

1. - Did you think that this last task required similar skills to those needed to perform on the mental maze?

Yes No

2. - Did you feel that you had made a noticeable improvement on the mental maze after the instruction?

Yes No

3. - On the following scale mark how much you feel you improved on the mental maze.

1....2....3....4....5....6....7
No Improvement — Excellent Improvement

4. - Do you have any other comments about the experiment in general? If so, please explain briefly.

APPENDIX IV

The following scale shows you the approximate number of symbols which have to be completed to obtain and average score. It also shows you the norms for above average and below average performance. Using these norms as a frame of reference, make a mark on the seven point scale which indicates how well you think you will do.

excellent	82-90
very good	71-82
above average	61-71
average	47-61
below average	34-36
defficient	17-23
poor	0-23

1....2....3....4....5....6....7
poor average excellent