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Control

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Locus of Control versus Situational Control

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Abstract

Rotter's I/E scale was administered to 50 students at Algoma University. Scores were rank ordered and counterbalanced for group assignment. The Active group had several choices prior to the experiment (room, list, seating arrangement). The other group, the Passive group, were simply informed of their conditions. Subjects were tested on a modified Jensen Alternation Board. The subjects attempted to guess which switch would be correct in a pattern. A light was illuminated to indicate a correct guess. Then subjects completed a questionnaire measuring their perceived success, their confidence in guessing, whether correct guesses were due to luck or skill, and whether a pattern was perceived in the guessing task. In the Active group, high internal scores on the Rotter scale correlated with increased confidence ratings ($r=.396$). Correlations were stronger in the Active group overall ($t=3.25$, $a=0.025$). The active group also showed a slightly higher tendency to perceive a pattern ($X^2=1.33$, $a=0.025$). There were no other statistically significant results

Locus of Control versus Situational Control

In any given situation, there are two forces at work on us which determine our reaction to the situation and our feelings about the situation. These are the outside forces or the situation we actually find ourselves in and the inside forces or our personality. Because we are a curious society, requiring explanations for events which occur in our lives, several words have appeared in our language which merit investigation. Specifically these are skill, chance and luck.

When the concepts of chance and skill related events are defined, definite relationships between the ideas appear. Skill-related events could be defined as events which are determined by a causal link between a behaviour and an outcome when the cause is controllable. A chance related event is an event that occurs which we have no control over. We label the cause and outcome of a chance event luck. It has been shown that people try to increase the amount of reinforcement they receive (Mook, 1987). If control over an outcome is a reinforcer and good luck or winning is a reinforcer, it makes sense that people may try to transfer variables which give them control in a

skill-related event on to a chance event, in order to increase their positive feelings.

This tendency has been labelled the 'illusion of control' (Langer, 1975). According to the theory, the factors governing skill-related events are direct participation in the situation, a choice, competition and familiarity or practice with the situation. These are elements which provide a clear causal link in skill related events. By artificially superimposing these factors on a chance event, people expect that they will have good luck (Langer, 1975).

A further understanding of the concept of luck might be gained by reviewing some of the literature surrounding superstition. Superstition is defined as a causal link falsely established between two unrelated chance events (Tobacyk, 1991). When an illusion of control is in effect, a person tends to establish false causal connections by associating a behaviour or an object with a chance fortuitous event (Tobacyk, 1991).

A correlational study designed to find a relationship between superstitious beliefs and predictions of the future investigated these illusory causal connections (Tobacyk, 1991). The Paranormal Beliefs Scale (PBS) and the Prediction of Future Events Scale were administered to 235 university students and

the results correlated positively. When the definition of superstition is expanded to include luck, the illusion of control theory may be utilized to provide explanations of the subjects' feelings of foresight.

A further study supported these findings by correlating superstition and a preference for games of chance (Tobacyk & Wilkinson, 1991). The PBS was administered to 235 college students and a questionnaire was given to determine game preference. An increased belief in superstition was associated with an overestimated sense of control over chance events. This was expressed as an increased expression of preference for games of chance. These findings tie in to the tendency of gamblers to overestimate the probability of winning these games (Tobacyk & Wilkinson, 1991).

A different test designed to measure belief in luck in order to see the effects of education on extraordinary beliefs was developed (Otis & Alcock, 1982). The Extraordinary Beliefs Inventory (EBI) was administered to members of the general public, first year university students and university professors in both sciences and humanities. They found that there was a definite negative correlation between level of education received and the degree of belief in

paranormal phenomenon. Those in the general public and the first year students tended to express a greater belief in the phenomenon than the professors (especially the science professors) (Otis & Alcock, 1982). This study indirectly related education to control or skill which would decrease the need for control over chance events, subsequently lowering the belief in superstitious phenomenon.

The correlational studies are interesting but serve mainly as starting points for empirical research. One empirical study on superstitious behaviour attempted to create superstitious subjects by using response independent reinforcers (chance) in a 'slot machine type test apparatus (Ono, 1987). The subjects (undergraduate students) were placed in front of an apparatus with levers, lights and buzzers. Points were delivered by a red light flashing and a buzzer sounding. The subjects were instructed to try to get as many points as possible. Of the 20 subjects, 3 developed persistent patterns of superstitious responding (Ono, 1987). The subjects who developed these patterns felt that their behaviours had triggered points; that they were in control over the point delivery system. They seemed to have placed a higher value on the reinforcement than the other subjects in

order to have developed such strong patterns of responding (Ono, 1987).

Another concepts governing people's perceptions of luck and chance is that of probability. Probability is the degree to which it is likely that a given event will occur in a certain way, based on assumptions about nature's uniformity, laws of change and equality of opportunity (Chaplin, 1985). In a coin toss situation, the probability of heads or tails appearing is 50/50. The greater the number of possible outcomes, the lower the probability that one will occur. Probability then, is the numerical estimate of the likelihood of the occurrence of an event. As the probability ratio approaches a 1:1 relationship, it becomes easier to determine the causal relationship between action and outcome. If given a chance event, the relationship between action and outcome becomes less clear. The probability ratio becomes lower when there is a greater uncertainty of an event occurring.

Subjective chance occurs when probability estimates go awry. A preference is shown for several low cost attempts at controlling a chance event that is low in probability of pay off rather than a single high cost attempt at an event with a higher probability of pay off. Cost, in this case, represents a degree of

effort or output. The reason being that the first scenario provides the subject with a greater degree of illusion of control over the probability of pay off, than does the single, high cost attempt (Cohen, 1973).

The 'gambler's fallacy' is another way probability is misunderstood. This is the tendency to incorrectly estimate that in a string of independent events the occurrence of one can change the likelihood of the next. In a coin toss situation, the probability for each toss of a coin in series is the same (50/50) for every toss. Predictions of outcomes tend to show an expectancy of a pattern occurring. In a series of coin tosses, most people will guess that 5 times the coin will turn heads and 5 times tails. This incorrectly places the probability estimate on the outcome rather than keeping it focused on the event, even though each toss has the same probability of coming up heads or tails, regardless of the number of repetitions of the event (Cohen, 1973).

When people are successful in predicting the outcome of a chance event there is a definite positive reinforcement and in turn, people are then reinforced to repeat the action that occurred just prior to the success. The attribution of a causal agent to success or failure is another part of the illusion of control.

People tend to believe that the association of causal connections to chance events puts the outcome in their control (Langer & Roth, 1975).

The preceding concepts are all examples of how outside variables effect the ways which we behave in any situation. Another integral part of how we react to a situation lies within us--our personality. One measure of personality is our degree and direction of our locus of control of reinforcement. The degree to which an individual believes that reinforcement is contingent on his or her behaviour or that events are controlled by external forces such as luck, fate or chance is labelled our 'locus of control' (Rotter, 1966). Individuals with a high External locus of control tend to attribute outcomes to luck or fate when no ready explanation is obvious, while high Internals tend to attribute outcomes to skill (controlled).

A test was designed to measure the degree and direction of locus of control. Rotter's I/E scale has been a standard in personality testing in psychology for over 20 years. The style of the test is a forced choice (either A or B) method which stresses the importance of choosing the answer which best applies to the individual--a measure of personal belief. As a research tool, it has been proven valid and reliable.

This experiment attempted to manipulate the degree of situational control the subject experienced in order to increase or decrease levels of confidence in success over the event. The rationale was to see if by manipulating choice in a chance situation, an illusion of control could be created (Langer, 1975). Thus, the degree of confidence of success would increase when choice is present, and decrease when choice was not present. Confidence is a measure of the degree of certainty of success a person feels in a given situation (Langer, 1975). Also, the group with situational control should remember a greater degree of success, attribute their results to skill and see a pattern more than the group not given situational control. This change should take place regardless of the direction of an individual's Locus of Control, but Internals should respond with greater confidence ratings overall when allowed situational control than will Externals (a negative correlation).

Method

Subjects

Subjects for this experiment were recruited on a voluntary basis from the population of undergraduate students at Algoma University. Some subjects received academic incentive for their participation. 50

students participated in this experiment. The average age was 27 years for both groups. Ages ranged from 19 to 44 years old.

Procedure

Rotter's I/E scale was administered prior to the experiment to determine the degree and direction of locus of control. Scores were rank ordered from highest to lowest Externally and counterbalanced prior to assignment to groups. Subjects were later contacted by phone to arrange a time to complete the experiment.

In the Active group, subjects were given several non-crucial choices within the experiment (the room they wished to sit in, the side of the desk they preferred). They also chose between two lists of patterns. (In reality, the lists are identical, so the choice was bogus). In the Passive group, subjects were simply informed of their assigned conditions (Appendix A).

The subjects participated in a 30 trial pattern guessing task using a modified Jensen Alternation Board (Appendix B). Subjects were instructed to guess which one of three switches would be correct in the pattern. Correct guesses triggered the light corresponding to the selected switch. In reality, the correct responses were predetermined by a random numbers table,

stacking the 'hits' (correct guesses) more heavily towards the end of the 30 trials. This was accomplished by operating a dial concealed from the subject which either triggered all three lights or none. The correct responses were arranged to allow an equal ratio of correct to incorrect responses. There were three correct responses within the first ten trials, five in the second ten trials and seven in the last ten trials (Appendix C). Once the experiment was completed, the subjects answered a short questionnaire to measure (on a Likert Scale) the degree of certainty of success (confidence), their perceived levels of success, whether they attributed their successes to luck or skill and whether they perceived a pattern to the experiment and what it was (See Appendix D).

Results were correlated with Rotter's I/E scale. Subjects were informed of the deception and the true nature of the experiment.

Results

There were no significant group differences for the questionnaire responses when group means were compared through a t-test (two-tailed) (remembered success-- $t=0.78$, luck or skill-- $t=0.09$, confidence-- $t=-.92$, and pattern perception-- $t=-1.15$) (Figure 1). The correlations between questionnaire responses and I/E

scores were not strong, but were negative (Figure 2). There was a significant difference between groups for the correlational data however ($t=-3.25$ $a=0.025$). The Active group showed stronger negative correlations between the first 3 questionnaire responses and their I/E scores than the passive group did (Figure 3). There was an overall trend for confidence to negatively correlate in both groups. Finally, a X^2 analysis revealed that the Active group perceived a pattern to the guesses very slightly more than the Passive group did ($X^2=1.33$, $a=0.025$) (Figure 4). There were no other significant results.

Discussion

Subjects scoring high on the External scale responded with reduced levels of confidence, remembered less success, attributed the results of their guessing to luck and did not tend to see a pattern in the experiment. The higher the subject scored internally, the greater confidence they expressed, the more success they remembered, the more they attributed the result to skill and the more they tended to perceive a pattern. This tendency only occurred in the Active group. The trend was not exhibited in significantly different group means however, so it is likely that the manipulation was not strong enough to produce a direct

effect. These results could be accounted for by several explanations.

One way to explain what happened is to say that when we are given situational control, our personality variables to come into effect but when the perceived situational control is not present, our personality is not a factor. This would mean that group differences may have appeared had the manipulation been stronger. This may or may not be the case however because of the nature of correlational data.

It could very well be that by giving the subjects the choices, it made them less confident overall. In fact, because of the apathy some subjects expressed, they had to be forced to choose, which may have actually reduced their confidence. They may have been "second-guessing" their choices because of experimental anxiety. This would have lowered their expression of confidence enough to remove group differences. As a matter of fact, the Passive group mean was slightly higher than the Active group mean (not significantly), which would support this hypothesis.

The correlations for remembered success and luck or skill attribution were not as strong as the correlations for confidence, and are not discussed at great length here. They followed the trends reported

by Langer & Roth (1975), but because of the uncertainty of the causal agent behind the effect exhibited, no real conclusions can be drawn.

Choice in a situation is a good thing, but it must be recognized that not wanting to chose is also a choice. If this experiment were to be replicated, this would be something to keep in mind. Also, rather than relying on correlational data, the extreme scores of the I/E scale should be used in order to produce a 2x2 experimental design. This, along with a stronger manipulation, or adding other factors from the illusion of control should produce an effect.

It would also be interesting to see if the effect is stronger with males or females. It has been previously determined that females respond with greater expressions of confidence when they are given situational control (Langer & Roth, 1975). I would recommend maintaining the same age group (perhaps more homogenous in age) due to the research done by Nicholls and Miller (1975), who suggest that children do not acquire the ability to differentiate between luck and skill until age 11 (+ or - 2). Maintaining the same age group would help to maintain the consistency of any effect which may be exhibited.

Generally speaking, in a gambling scenario, some people like to think that they have a chance of winning. They often perform short rituals within the scenario that may be seen as similar to the choices given the subjects in this experiment. They may shake the dice a certain number of times, they may prefer a certain type of scratch-and-win card, or always go to the same store. Either way, whether or not it is expressed as such, people seem to believe that these rituals enhance their chances of winning somehow, especially if they are reinforced by a win. The results of any replications of this experiment may be useful to aid in explaining how inside and outside variables interact in a gambling scenario.

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Figure Captions

Figure 1: The between group differences are shown for the responses to the questionnaire. There are no significant differences between groups (Success $t=0.78$, Luck/Skl $t=0.09$, Confidence $t=0.92$, Pattern $t=-1.15$).

Figure 2: The Pearson's r correlations are shown for the responses to the questionnaire and I/E scores.

Figure 3: The between group differences for correlations are shown for the responses to the questionnaire and I/E scores. These results were significant ($t=-3.23$ $\alpha=0.025$).

Figure 4: A Chi Square analysis showing that the Active group perceived a pattern slightly significantly more than the Passive group. This is marginally significant ($\chi^2=1.333$).

Appendix A: Instructions to Subjects

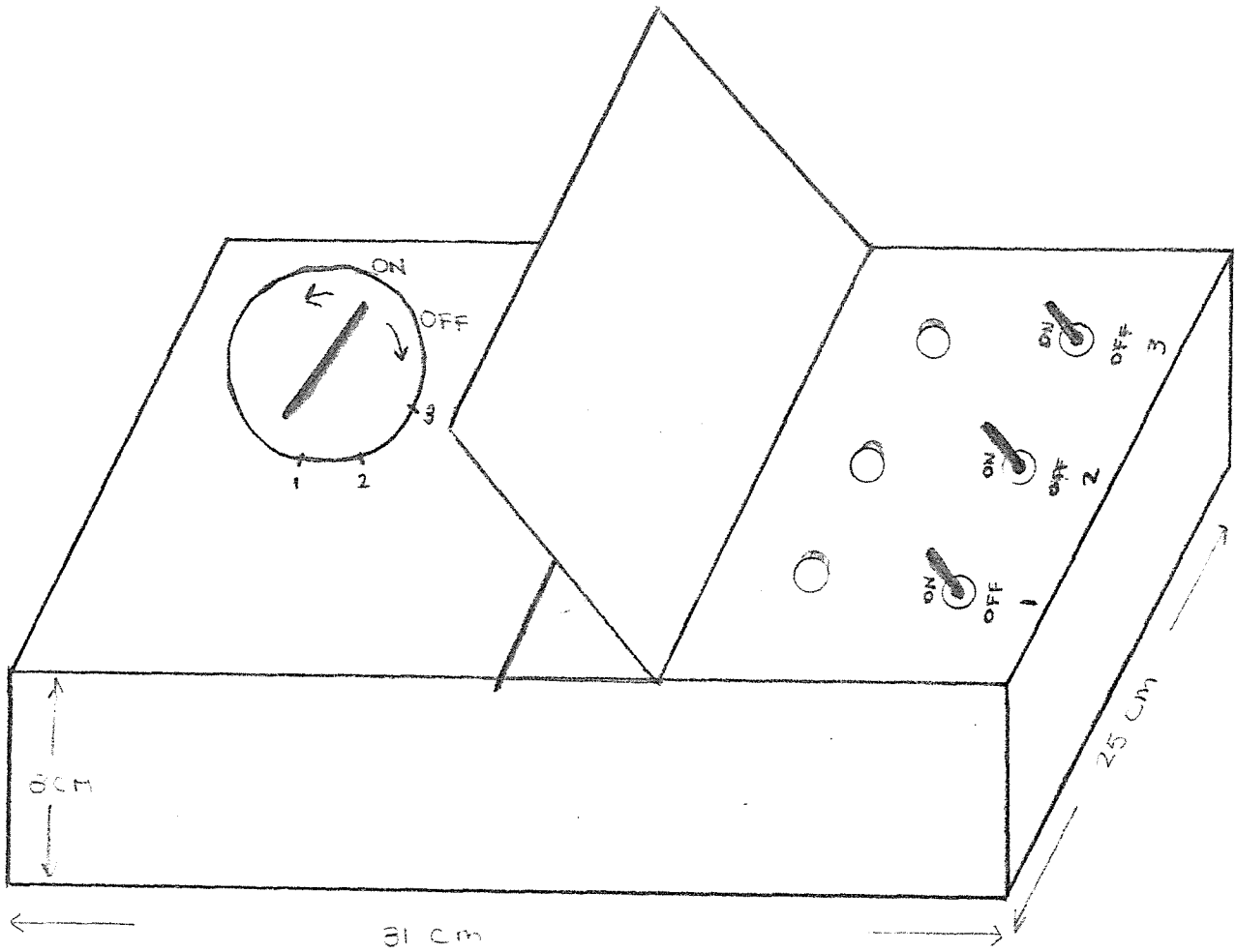
Active: Subjects were contacted by phone to arrange a mutually convenient time. They were given a choice of two identical (more or less) rooms. They will be given a choice of the side of the desk they sit at, and a choice between List A or B (there is absolutely no difference).

"This is a simple pattern guessing task. You try to figure out the pattern by selecting, one at a time, one of these three switches, which triggers it's corresponding light (demonstrate that the switch actually triggers the lights). You have 30 guesses. I will record your responses. After, you will be given a brief questionnaire. Do you understand? Are there any questions?"

Passive: Subjects were contacted by phone to arrange a mutually convenient time. They were told that they were assigned to one of two rooms. They were told that they were assigned to one side of the desk. They were told that they were assigned to one of two lists.

Instructions are the same for both groups.

Appendix B: Jensen Alternation Board



Appendix C: Data Sheet

Group # _____ Subject# _____ Age _____ Date _____ Time _____
Trial Response Outcome

1		
2		+
3		
4		+
5		
6		+
7		
8		
9		
10		
11		+
12		+
13		
14		+
15		+
16		
17		
18		
19		+
20		
21		+
22		+
23		+
24		+
25		
26		+
27		
28		
29		+
30		+

Appendix D: Questionnaire

Subject # _____

1. How would you rate your success at guessing (1--not successful at all, 7--totally successful) 1 - - - - - 7

2. Rate to what extent you attributed the results of your guesses to luck or skill (1 is all luck, 7 is completely skill) 1 - - - - - 7

3. With what degree of certainty did you feel you would guess correctly (1 is not certain at all, 7 is completely certain) 1 - - - - - 7

4. Did you perceive a pattern in the experiment? Y/N

5. Any comments?

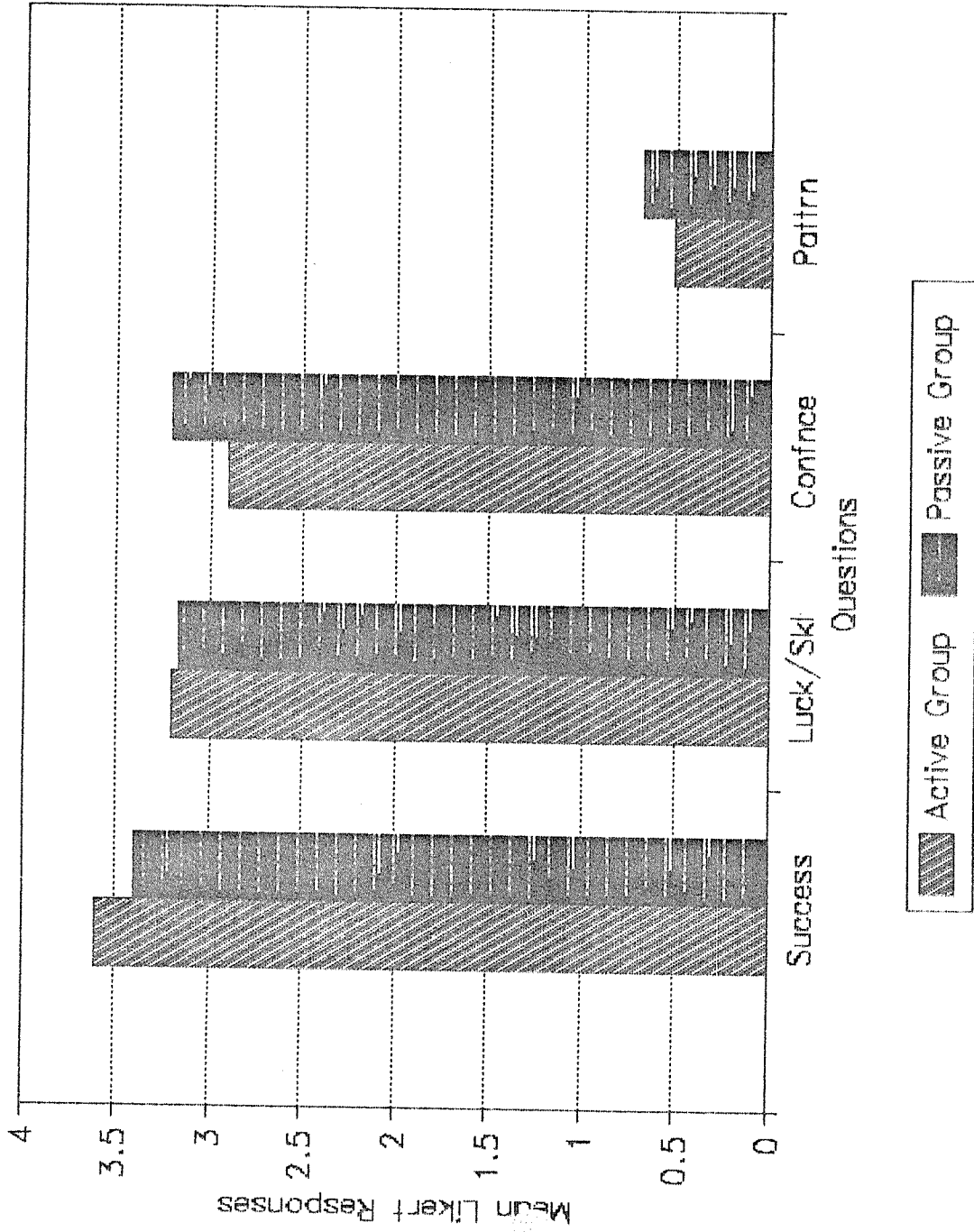


Figure 1

group	*	Remembered success	Attribution to luck or skill	Confidence in guessing
	*			
	*			
	*			
Active	*	-0.264	-0.215	-0.396
	*			
	*			
	*			
	*			
	*			
	*			
Passive	*	-0.024	-0.069	-0.148
	*			
	*			
	*			
	*			
	*			

Figure 2

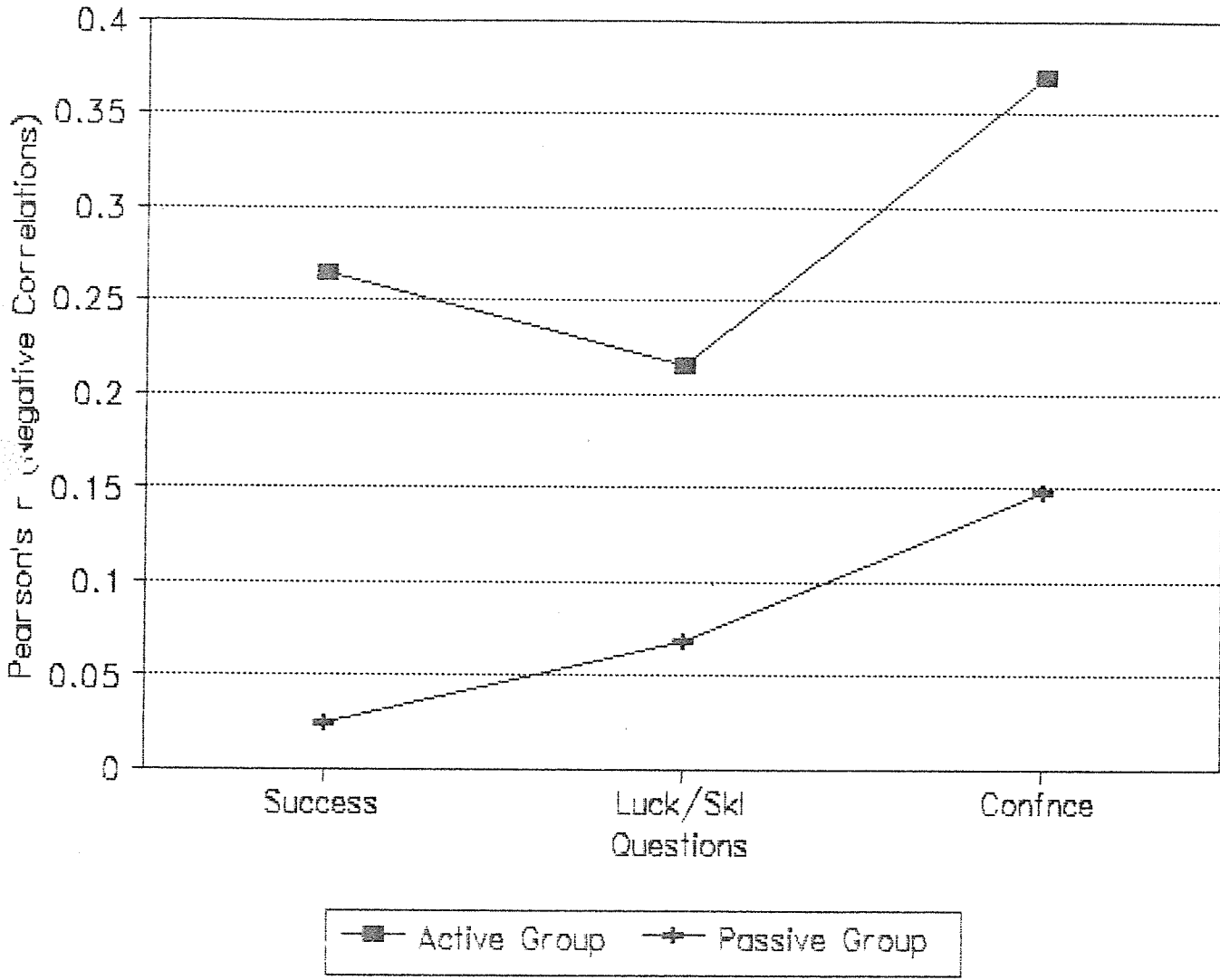


Figure 3

Group	Pattern Perceived	Pattern Not Perceived	Total
Passive	13 15.00	12 10.00	25
Active	17 15.00	8 10.00	25
Total	30	20	50

ChiSq = 1.333
df = 1

Figure 4