

**Reinforcement of Expressions of Opinion to Control Elements of a Conversation**

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Psy. S302.

for Pauline Arnold

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## 1. Introduction

Skinner's (1957) research into verbal behaviour has suggested that verbal behaviour may be shaped by classical and verbal operant conditioning paradigms. In classical conditioning, we learn to giving a happy comment when a pleasant event occurs or a negative comment when an unpleasant event happens.

In operant conditioning, the frequency of any verbal comments in conversations by a speaker are reduced to avoid aversive verbal response or body language (frowns) by the listener as a result of learning from previous experiences of negative reactions to those comments. The talker will increase verbal behaviour to elicit reinforcing verbal feedback or body language (smiles, nods) from a listener based on the talker's previous experience of positive reactions to such behaviour. The intensity, contingency and appropriateness of reinforcement or punishment influences its effectiveness. Reinforcement is defined as something which is wanted by the subject while punishment is an aversive stimulus which the subject seeks to avoid.

Subjects may also shape the frequency of their verbal behaviour by observing models and the reactions of others to the verbal behaviour of these models.

This explanation of verbal behaviour has been substantially supported in numerous experiments (Krasner, 1958). The subject is usually asked to emit verbal behaviour, while the experimenter reinforces one type of verbal response. The dependent variable is the frequency of desired response in the talker's verbal behaviour while the independent variable are conditioned reinforcers as perceived by the talker as inherent in the listener's reactions.

In an operant conditioning of verbal behaviour experiment William Verplanck (1955) found that

reinforcement of statements of opinion in conversations increased the probability of the repetition of opinions. Withdrawal of reinforcement by disagreement or ignoring opinions caused extinction, being a decrease in statements of opinion relative to statements.

Verplanck (1955) defined opinions as statements prefaced by statements such as 'I guess,' 'I feel,' and 'I think.' Reinforcement was provided by statements of agreement or use of paraphrase. Measurement was of the relative frequency of opinions which were calculated by dividing the cumulative number of opinions by the cumulative number of statements. Subjects were unaware that they were being conditioned.

In a replication of the experiment, Azrin *et al* (1961) felt that the experimenters' speech biased the response of the subjects to respond with opinions. They suggested that different expectations by the experimenters would cause different results.

Newmark *et al* (1975) overcame this methodological deficit by use of videotape, timed response analysis and standardised verbal reinforcers. Verbal reinforcement of opinions increased their probability, particularly amongst low neurotic students as compared with highly neurotic students.

Centers (1963) replicated Verplanck's (1955) experiment but also reinforced statements of information and questions as well as opinions. Reinforcement included attention, smiling and positive body language and answers to questions as well as paraphrase and agreement. Disagreement, evasive responses and silence were used for extinction. Results showed an increase in verbalisation, information input, questioning and opinions during reinforcement and a decrease during the extinction phase. Once again, subjects were unaware of the conditioning process.

Primac (1980) also successfully used operant conditioning techniques to reduce statements of attitudes of prejudice toward black people. Expressions of prejudice were measured by the number of negative versus positive adjectives used by experimental groups as compared to control groups. Positive

verbal comments were used for reinforcement. Difficulty was found initially in obtaining a sufficient number of positive adjectives to provide clear reinforcement.

O'Donnell *et al* (1983) investigated the effects of subject awareness of the conditioning process. Spielberger & De Nike (1966, in O'Donnell, 1983) have suggested that awareness should not affect conditioning and particularly should not lead to resistance. Rather, subjects would use their awareness to explain their performance gain. O'Donnell (1983) found that awareness increased when extinction trials were dropped, and the forty-two percent minority of aware subjects who failed to condition perceived the experiment as an influence attempt rather than a problem solving exercise.

This experiment examines both the effects of verbal operant conditioning on verbal behaviour and compares the effects of awareness and non-awareness on conditioning. Provision of reinforcement by tapping a pencil for each opinion should increase the frequency of opinion giving behaviour while deprivation of reinforcement should lead to a decrease in opinion giving behaviour. Conscious awareness of the perception of reinforcement for giving opinions should increase opinion giving since subjects were instructed to maximise their reinforcement.

## **2. Method**

### **2.1 Subjects**

Subjects were twenty three third year psychology students of mixed sex enrolled in a Human Learning and Motivation course at Murdoch University, Perth, West Australia.

## 2.2 Apparatus

The experimenter use a pencil and paper to record the frequency of points given to the subject and a stop watch to monitor time.

## 2.3 Procedures

Students worked in pairs with one subject randomly assigned to one experimenter. Verbal instructions were read to the subject from a sheet by the experimenter. These stated that the subject was to talk on any topic for 33 minutes while the experimenter was to remain silent. For the first fifteen minutes, the experimenter tapped a pen every time an opinionated statement was made such as 'I think that' or 'I believe that.' Subjects recorded the points scored.

For the next nine minutes no points were given during the extinction period. For the final rein-statement nine minutes, points were given again.

Points were recorded by the experimenter of the number of opinionated statements made every three minutes for thirty three minutes. Subjects were then asked the reason why they received points and were classified as aware or non-aware.

*Details of talking?*

## 3. Results

Subjects were classified under two conditions aware and unaware with regards to their conscious knowledge of reinforcement. To permit easier data analysis subject one in the aware group, who was closest to the group's mean score was dropped from analysis.

Because means are frequently adversely affected by outlier values, the initial or raw data was first

reviewed. Using Tukey's (Hinkle, Wiersma & Juris, 1988) five number summary in a box and whisker diagram, results are displayed in Figure 1. Upper and lower range, interquartile scores and medians are displayed.

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Insert Figure 1 Here  
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The median for the unaware phase is one opinion given during the fifteen minute reinforcement phase. Over a quarter of the unaware population did not give an opinion. Seventy five percent of the unaware group gave less than three opinions. In contrast a median score of five opinions were given during the reinforcement phase by the aware group. The outlier upper range values of 12 and 18 for the unaware and aware group are well above the upper interquartile scores. These outliers have skewed the means upward relative to the medians.

For the extinction phase median values for the unaware and aware categories were very close at two and three opinions. The lower interquartile scores indicate that over one quarter of the population had no or one opinion for the unaware and aware categories. Seventy five percent of the unaware and aware groups gave less than 4 or 7 opinions.

For the reinstatement phase twenty five percent of both unaware and aware groups gave no opinions. The median scores were one and four opinions respectively. Seventy five percent gave up to 4.5 or eight opinions respectively. The large upper ranges of 35 and 30 opinions vastly exceed the median and interquartile scores, indicating the presence of extreme scores.

The mean response for eleven subjects in the unaware group and eleven students in the aware group was calculated for three phases of reinforcement. The response rate for opinions were averaged over a three minute period. Results are shown in Figure 2.

-----  
Insert Fig. 2 Here

Number of Opinions Expressed by Aware and Unaware Subjects  
During Reinforcement, Extinction and Reinstatement  
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The graph indicates that subjects in the aware condition made substantially more opinionated statements during an averaged three minute period than subjects who were unaware of reasons for obtaining reinforcement. During the extinction phase both aware and unaware subjects were very similar in the number of opinionated statements which they made. However, during the restatement of reinforcement phase, aware subjects substantially increased the number of opinionated statements to a level slightly above their reinforcement phase performance. Unaware subjects did not increase their performance much beyond the extinction phase, and were well below the number of opinionated statements given during an averaged three minute period as compared with the aware subjects.

A two by three fixed effect factorial ANOVA was computed to determine the significant between means for both main effects for the population. Results are shown in Table 1.



*Table 1: Two Way ANOVA Analysis of Difference in Means for Awareness and Reinforcement in Eliciting Opinions During Conversation.*

Source	SS	DF	MS	F	Critical Value
SSj	61.4	1	61.4	3.9	4
SSk	9.3	2	4.7	.30	3.15
SSjk	10.8	2	5.4	.35	3.15
SSw	939.7	60	15.7		
SS <sub>t</sub>	1021.265				

*You should have used a mixed model Anova. The products were the same, however!*

Results were insignificant for both main effects and for the interaction. ( $p > .05$ ) The largest apparent change in performance during reinforcement, extinction and reinstatement was for the aware group. Yet a repeated ANOVA indicated no significant difference between means for reinforcement, extinction and the reinstatement phases for this group. [ $F 1.32 (2,20) p > .05$ ]

*a figure showing the 3 min or less would have been very useful.*

#### **4. Discussion**

There was no support found for the hypothesis that there would be a significant decrease in the number of opinions given in a conversation when opinions were not reinforced and a significant increase in opinions expressed when opinions were reinforced.

There was no support for the hypothesis that the group who was aware that they were being reinforced for giving opinions would give more opinions than the group who were unaware that they were being reinforced for giving opinions.

The most significant reason for the lack of conditioning during the first phase was lack of emit-

ted correct behaviour which could be reinforced. For the unaware group, the low median value of one opinion reinforced in fifteen minutes indicates that so few opinions were expressed and reinforced, that it was not possible for subjects to make a judgment concerning factors which were being reinforced. Even for the aware group, a median value of five opinions in fifteen minutes was inadequate for making an accurate judgment during reinforcement. Also during the reinstatement phase, most subjects classified as unaware, failed to emit the correct behaviours consistently at a sufficient frequency to gain adequate reinforcement. Mean results were skewed artificially upwards by a few very high frequency responses. In the reinstatement phase, aware students generally were reinforced regularly, explaining a nearly significant relationship for the first main effect.

Secondly, for reinforcement to be effective, it must be contingent and appropriate. Reinforcement must be a reward desired by the subject. It may be possible that all subjects did not consider pen tapping as a reinforcer. Ball (1952, in Krasner, 1958) in an experiment reinforcing story telling behaviour also found an insignificant increase in story telling behaviours when light and tones were used as reinforcers. It was an inappropriate reward in a verbal exercise in which verbal recognition was desired. Verplanck (1955) has found paraphrase to be the most effective reinforcement in conversation. It may also have been difficult to analyse statements of opinion leading to delayed responses which were not contingent with opinions. Verplanck (1955) notes the need for highly trained experimenters to interpret statements of opinion accurately. Experimenters received no training in this experiment. Skinner (1957) suggests that contingency is critical for effective reinforcement. Misunderstanding directions and perceiving pen tapping to be an indication of censure may have affected the results.

Perhaps one reason for the lack of a significant change in the number of opinions given by subjects rested with the <sup>BAE. Malley.</sup> ABA design. No control group was used. No baseline data was initially gathered about the number of opinions normally used in conversations without explicit reinforcement. The initial condition in this ABA design involved reinforcement of the speakers. In the extinction stage, it is not known to what extent a baseline condition was obtained. It is expected that the reinforcement effects may have carried over into the extinction period reducing the expected decline in use of opinions. Also,

opinions related to unhappiness with the experiment caused by talking fifteen minutes without feedback may have increased the number of opinions in the extinction phase as an artifact of the experimental design. Consequently, the magnitude of change between the reinforcement and extinction conditions and extinction and reinstatement phases was not obtained. Krasner (1958) has indicated that many studies into operant conditioning first gather baseline data or use a control group to overcome this design difficulty.

It is questionable whether learning can occur without knowledge that behaviour is changing. Hayes and Broadbent (1988) in an examination of selective versus unselective learning suggest that information may be absorbed unconsciously when there are many variables involved, but such learning is available to improve performance on tasks. Reber (1990) suggests that tacit or unconscious knowledge is implicitly used in problem solving and in making correct decisions about unfamiliar situations. Tatz (1956, in Krasner, 1958) states: "Students may 'evolve' partial solutions, even when they are told that there is nothing to solve. Further, these partial solutions ... may mediate a level of responding higher than expected by chance" (p. 161). Such evidence suggests a greater similarity between unaware and aware subjects in their processing of reinforcement than has been hypothesised.

In addition to doubt as to what is meant by awareness, there was some doubt as to when the aware group became aware that they were being reinforced for stating opinions. Some students may have been aware from the beginning, having heard about the experiment from friends who had completed the task earlier. The drop in opinions during the extinction phase may have been a conscious decision by aware students as a result of lack of reinforcement. However the decline may also suggest support for operant conditioning with the proviso that many students gained their awareness during the re-statement phase.

Problems apparent with the experiment was the use of students who had been primed to expect some type of reinforcement for certain comments. Because students were being awarded points for

recognising and responding to the verbal behaviour which was being reinforced, responses would be expected to be high.

The study did not consider personality characteristics and individual differences of the speakers. Krasner (1958) summarises studies which indicate personality characteristics to be important. Extraversion versus introversion, degree of anxiety, need for achievement, and defensiveness have been shown (Krasner, 1958) to influence susceptibility to the degree of conditioning. Anxious subjects, for instance, condition more quickly, while hostile subjects may be resilient to conditioning. Subjects vary in their willingness to express personal opinions but most do not like to give opinions when with people they may not know. The lack of opinions by many subjects with many opinions by a few has demonstrated a need for a single subject design.

Statistical analyses may be suspect. Assumptions including normality of distribution of subjects and homogeneity of variance may not be met (Hinkle *et al*, 1988), suggesting need for use of non-parametric statistics. Use of a repeated measure MANOVA for repeated measures across three conditions with unequal subjects would be more appropriate when a normal distribution assumption is met.

In spite of design deficits in this experiment, the importance of operant conditioning of conversation is beyond doubt. It plays vital roles in the areas of prejudice, attitude formation, and social persuasion. Applications such as encouraging decision making and emotional expressiveness have direct applications for therapists. As Krasner (1958) suggests, therapists learn which of their behaviours is most effective in meeting the needs of their clients and act accordingly. The patient subsequently responds in a desired way in response to reinforcement which has been received previously.

The area of awareness is also suspect. To what extent do people learn unconsciously? These considerations merit further exploration by researchers.

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A

# Tukey's Box & Whisker Diagrams

## Effects of Reinforcement on Behaviour

0.2-60  
100%

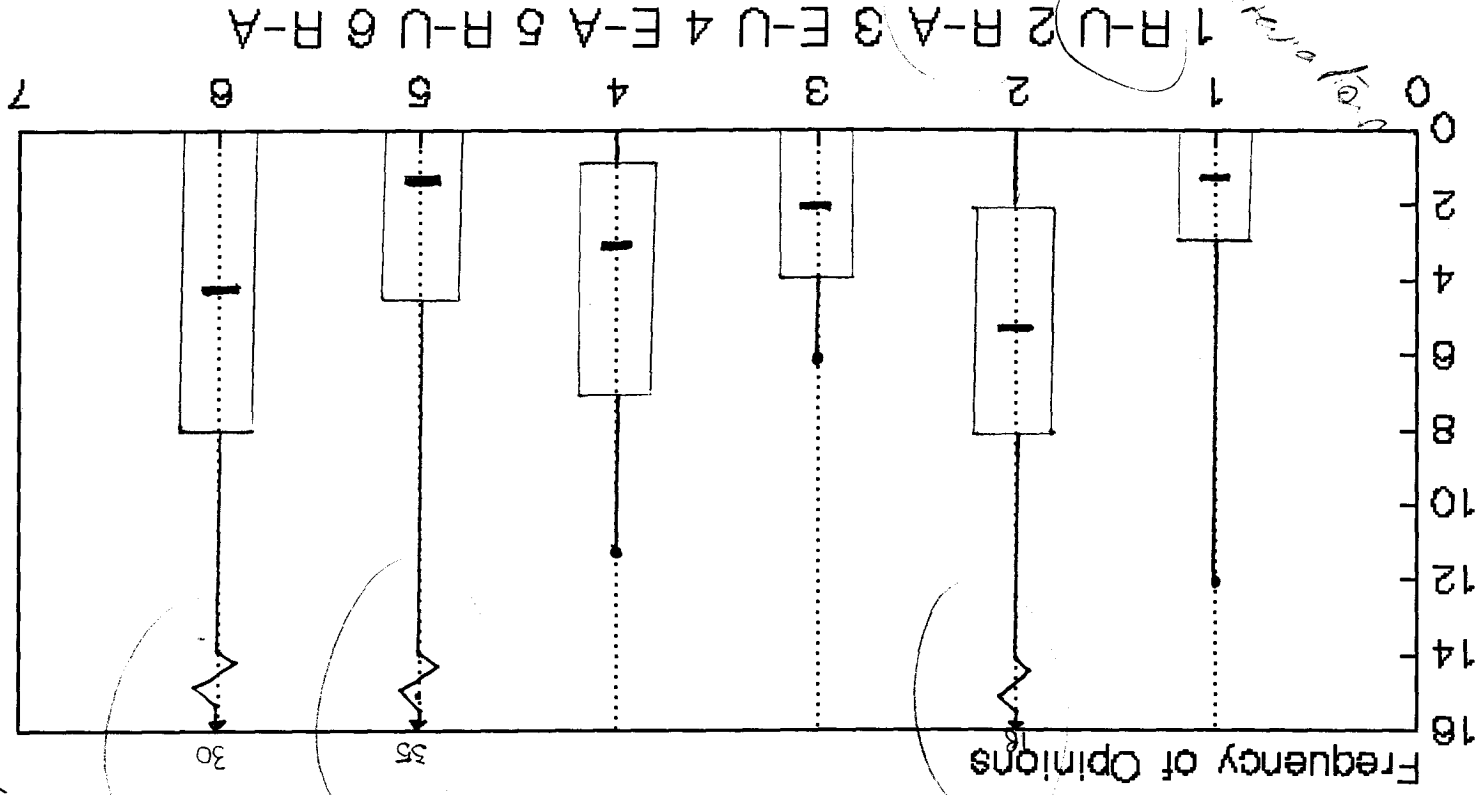


Fig. 1

# Calculations

Raw Data  $\longrightarrow$  average Square

## Unaware Group Conditioned

Three	Six	Nine	Twelve	Fifteen	Three Min	
0	0	1	2	2	1	1
6	12	5	7	11	8.2	67.24
1	0	6	0	1	1.6	2.56
2	0	1	0	0	0.6	0.36
0	0	1	0	1	0.4	0.16
2	2	0	2	1	1.4	1.96
3	3	6	10	7	5.8	33.64
1	3	2	1	1	1.6	2.56
1	2	3	3	6	3	9
1	3	1	0	5	2	4
4	0	0	1	2	1.4	1.96
=====						
21	25	26	26	37	0	
Total	135	Mean	2.454545	Total	27	124.44
Three Min	27			Mean	2.454545	

## Extinction

4	2	1			2.333333	5.444444
16	13	12			13.666666	186.7777
0	0	0			0	0
0	0	0			0	0
2	3	3			2.666666	7.111111
1	1	0			0.666666	0.444444
9	3	5			5.666666	32.111111
2	1	0			1	1
3	4	1			2.666666	7.111111
6	5	3			4.666666	21.77777
2	1	1			1.333333	1.777777
=====						
45	33	26				
Total	104	Mean	3.151515	Total	34.66666	263.5555
Three min	34.66666			Mean	3.151515	

## Reinstatement

0	0	0			0	0
9	10	9			9.333333	87.11111
0	1	2			1	1
0	0	0			0	0
1	1	2			1.333333	1.777777
0	0	0			0	0
5	2	6			4.333333	18.77777
5	3	2			3.333333	11.11111
1	2	35			12.66666	160.4444
4	2	6			4	16
1	0	1			0.666666	0.444444
=====						
26	21	63				
Total	110	Mean	3.333333	Total	36.66666	296.6666
Three min	36.66666			Mean	3.333333	



**AWARENESSGROUP  
Reinforcement**

12	8	17	12	7	11.2	125.44
7	11	2	6	8	6.8	46.24
9	3	0	6	3	4.2	17.64
6	8	4	5	3	5.2	27.04
7	2	5	8	3	5	25
1	1	1	1	1	1	1
3	6	2	0	9	4	16
6	4	4	2	1	3.4	11.56
2	10	5	8	5	6	36
0	2	1	0	4	1.4	1.96
18	7	9	6	4	8.8	77.44

ERR	ERR	ERR	ERR	ERR		
Total	310	Mean	5.166666	Total	57	385.32
Three Min	62			Mean	5.181818	

**Extinction**

11	11	7	9.666666	93.44444
8	7	6	7	49
7	2	2	3.666666	13.44444
1	2	1	1.333333	1.777777
5	8	7	6.666666	44.44444
0	1	0	0.333333	0.111111
7	2	1	3.333333	11.11111
1	0	3	1.333333	1.777777
3	4	4	3.666666	13.44444
2	2	1	1.666666	2.777777
7	5	3	5	25

ERR	ERR	ERR	ERR	Total	43.66666	256.3333
Total	ERR	Mean	ERR	Mean	3.969696	
Three Min	ERR					

**Reimstatement**

21	13	15	16.33333	266.7777
0	5	10	5	25
0	0	2	0.666666	0.444444
1	1	1	1	1
6	6	8	6.666666	44.44444
0	0	0	0	0
5	17	30	17.33333	300.4444
2	0	0	0.666666	0.444444
9	8	5	7.333333	53.77777
0	2	1	1	1
7	5	4	5.333333	28.44444

ERR	ERR	ERR	ERR	Total	61.33333	721.7777
Total	ERR	Mean	ERR	Mean	5.575757	
Three Min	ERR					

Table

2.35	3.15	3.42
5.17	3.86	5.61
1	2	3

Reinforcement Used in Programme

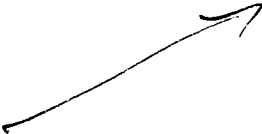
	Reinforce	Extinct	Reinstate	
Aware	57	43.66666	61.33333	162
	5.181818	3.969696	5.575757	4.909090
	385.32	256.3333	721.7777	1363.431
Unaware	27	34.66666	36.66666	98.33333
	2.454545	3.151515	3.333333	2.979797
	124.44	263.5555	296.6666	684.6622

	84	78.33333	98	260.3333
	3.818181	3.560606	4.454545	3.944444
	509.76	519.8888	1018.444	2048.093

	Source	SS	DF	MS	F Score	
ET^2j	35913.44	SSj	61.41582	1	61.41582	3.921581
ET^2k	22796.11	SSk	9.316498	2	4.658249	0.297442
EET^2jk	12192.77	SSjk	10.83164	2	5.415824	0.345816
T	260.3333	SSw	939.6589	60	15.66098	
EEEX^2	2048.093	SST	1021.222	65		

Critical F Values

4  
3.15  
3.15

  
Anova Table.

Tot mean

-6.321 -29.2296  
-1.921 -2.163  
0.679 9.103666  
-0.321 7.437  
-0.121 -3.69633  
3.879 13.637  
0.879 -24.0296  
1.479 9.903666  
-1.121 -6.02966  
3.479 11.237  
-3.921 -4.82966  
4.879  
4.879  
-52.121  
-0.30281  
4.879  
4.879  
4.879  
-4.78766  
-2.121  
1.212333  
3.545666  
-1.78766  
4.545666  
1.545666  
3.545666  
1.212333  
3.212333  
-0.121  
4.879  
4.879  
-38.7876  
0.909303  
4.879  
4.879  
4.879  
-11.4543  
-0.121  
4.212333  
3.879  
-1.78766  
4.879  
-12.4543  
4.212333  
-2.45433  
3.879  
-0.45433  
\* 4.879