

# POSSIBLE EFFECTS OF AIR POLLUTION AND URBANIZATION ON VISIBILITY IN THE KUALA LUMPUR — PETALING JAYA AREA

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## SYNOPSIS

*The only available data from the Airport have been used to examine the effects of air pollution and urbanization on visibility in the Kuala Lumpur — Petaling Jaya area. Although evidence were still inconcluswe, there appeared to be a slight trend of deteriorating visibility during the 1966—75 decade particularly in the visibility range of  $\geq 32.0$  km ( $\geq 20$  miles). The growth of urbanization and industrial development within and around Kuala Lumpur — Petaling Jaya coupled with the absence of any form of smoke control measures have probably been the major contributory factors.*

## SYNOPSIS

*Data penglihatan yang hanya dapat diperolehi di lapangan terbang telah digunakan untuk meneliti pengaruh pencemaran udara dan perbandaran terhadap penglihatan di Kuala Lumpur — Petaling Jaya. Walaupun bukti-bukti masih lagi tidak jelas, suatu tren yang menunjukkan kemerosotan penglihatan (1966-75) terdapat terutama dalam jarak penglihatan  $\geq 32.0$  km ( $\geq 20$  batu). Pertumbuhan bandar dan perkembangan industri di dalam dan sekitar Kuala Lumpur — Petaling Jaya disertai dengan tidak adanya apa-apa langkah mencegah pencemaran telah merupakan faktor utama menyebabkan berlakunya kemerosotan tersebut.*

## Introduction

As a result of air pollution and the associated high aerosol concentrations, visibilities are lower and occurrences of fog are reported to be higher in cities than outside the metropolitan area (Holzworth & Maga, 1960; Georgii & Hoffman, 1966:511, McNulty, 1968). Recent reports indicate that visibility in many locations in Europe and North America has improved during the last two decades coinciding with local efforts at air pollution abatement and the substitution of oil and gas for soft coal in heat production (Bloodworth, 1953:78; Beebe, 1967). Possibly, the migration of industry to surrounding satellite towns has also had an effect (Bryson & Ross, 1972). Whether or not local efforts at air pollution

abatement have been responsible for substantial improvements in air quality has recently been doubted by Auliciems and Burton (1973).

This paper attempts to examine the extent to which air pollution in Kuala Lumpur—Petaling Jaya has affected visibility.

### **Analytical Procedures**

As visibility data for Kuala Lumpur—Petaling Jaya were available only at the Airport in Subang, a method due to Corfield and Newton (1966) was adopted in order to assess the possible effect of urban area as a general pollution source upon visibility.

Relative to the airport, Kuala Lumpur—Petaling Jaya lies in the sector  $35^{\circ}$ – $135^{\circ}$ . This means that if visibility data with winds in the  $35^{\circ}$ – $135^{\circ}$  sector are analyzed, a rough indication of effects of Kuala Lumpur—Petaling Jaya as a general pollution source on visibility may be obtained (Figure 1). In this analysis the applied assumption is that the wind direction at the time of the visibility observation is roughly representative of the trajectory of the air since it passes over significant pollutant sources. In order to eliminate visibility reduction due to natural causes, the observations considered were restricted to periods in which wind speeds were  $0.5\text{ms}^{-1}$  and over, no precipitation was occurring, and relative humidity was less than 90 percent.

Visibility trend was examined using the method due to Holzworth and Maga (1960) and Holzworth (1961). In this method, it is considered that for any one year the total frequency of observed visibilities in all ranges is 100 percent; this is true also for the frequencies determined from the linear regression lines (Figure 2). Therefore, the initial and terminal points of the regression lines may be used to obtain the net percentage frequency changes over the span of years considered, as shown in the right portion of Figure 2.

Here, the total resultant shift downward to lower visibility range is 26.7 percent, the total upward to higher ranges is 26.3 and the sum is 0.4 percent downward. In this particular case, therefore, there is a very slight trend of deteriorating visibility.

### **Visibility in Kuala Lumpur — Petaling Jaya**

The percentage distribution of visibility in five ranges for the periods 1966—70 and 1971—75, and occurrences of visibility for six overlapping four-year periods with wind directions in the sector  $35^{\circ}$ – $135^{\circ}$  are shown in Tables 1 and 2 respectively. The increase of haziness particularly in the visibility range  $\geq 32.0$  km ( $\geq 20$  miles) appeared to be consistent with the growth of built-up areas without smoke control. The Ministry of Science, Technology and the Environment has been established only relatively recently and hitherto there has been little in the way of air pollution control measures being enforced either on industries or motor vehicles. This, coupled with the steady growth of urbanization and industrial development within and around Kuala Lumpur — Petaling Jaya in the last five or six years, are probably the major contributory factors in the worsening of visibilities.

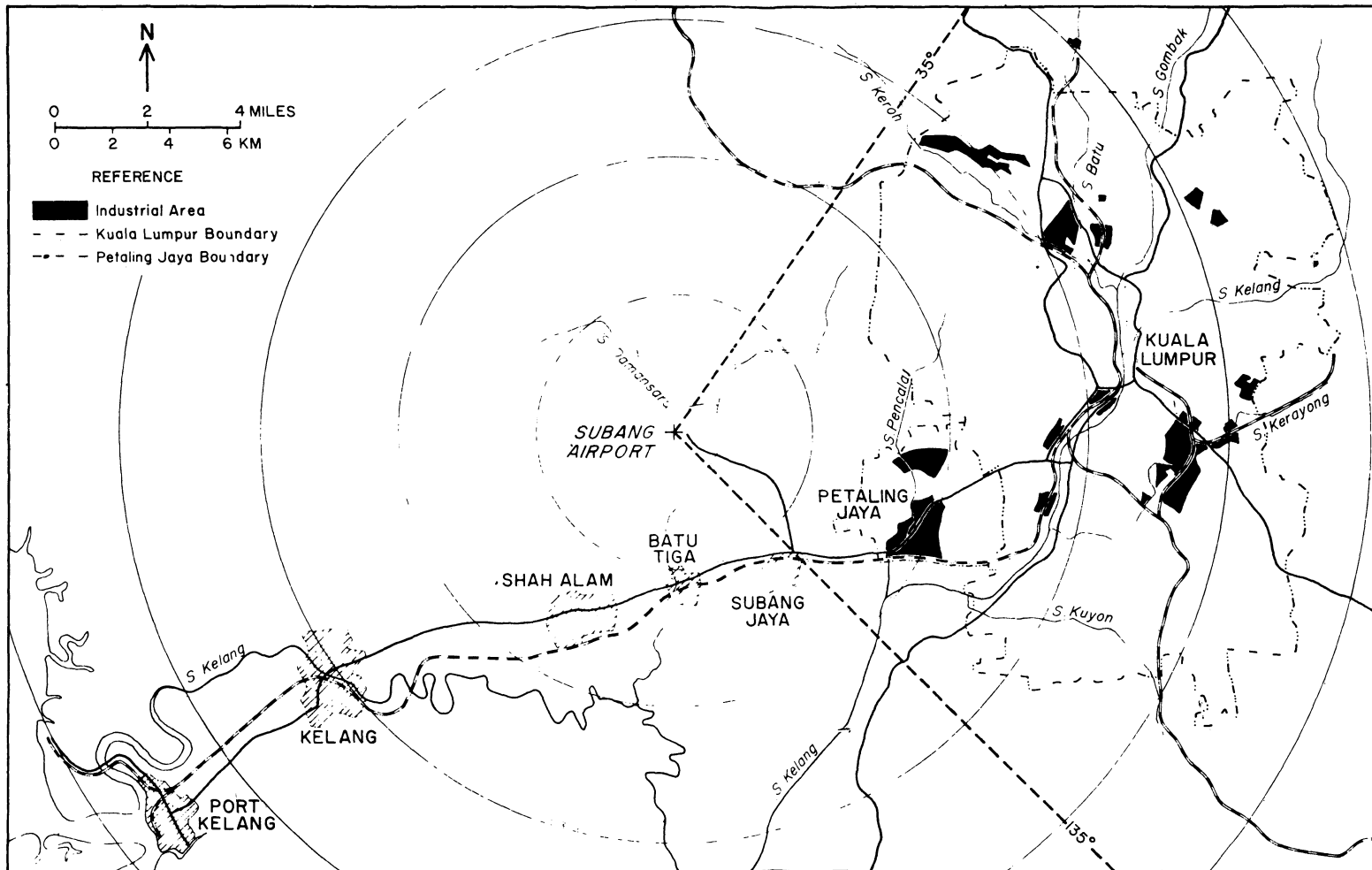
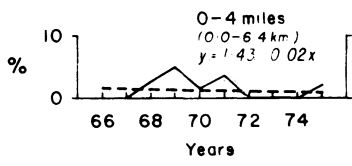
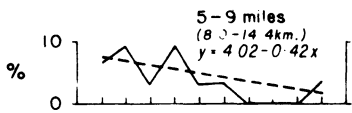
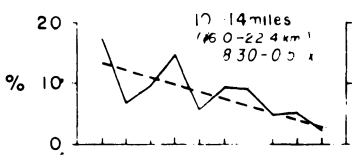
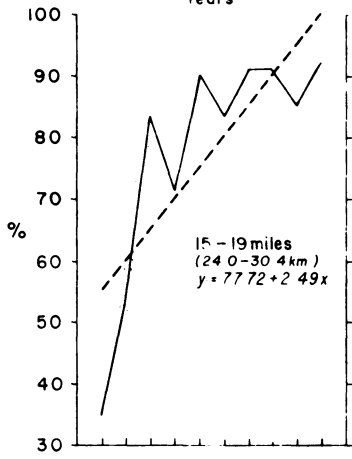
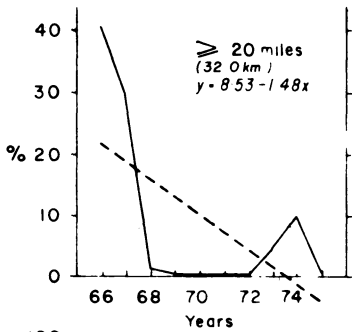


Figure 1: Kuala Lumpur — Petaling Jaya in relation to Subang Airport

PERCENT FREQUENCIES OF VISIBILITIES IN GIVEN RANGES BY YEARS WITH LINEAR TREND LINE

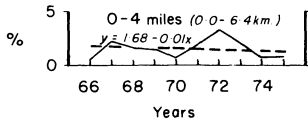
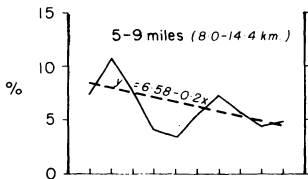
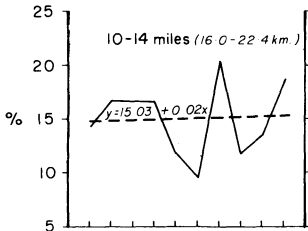
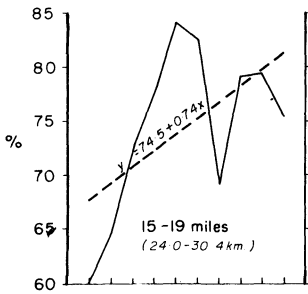
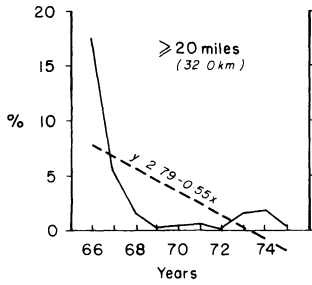


FLUX OF VISIBILITY FREQUENCY CHANGES

FREQUENCY		NET CHANGE		FLUX OF RESULTANT CHANGES	
1966	1975	66	75		
21.9	-4.8	-26.7	+ 0	=	-26.7
55.3	100.1	+44.8	+ -18.1	=	0
13.4	3.2	-10.2	+ -7.9	=	-18.1
7.8	0.2	-7.6	+ -0.3	=	-7.9
1.6	1.3	-0.3	+ 0	=	-0.3

Figure 2 Percent frequencies of visibilities in given ranges by years (left) and schematic shift of visibility frequency changes (right) at Subang airport in February, 1966-75. Linear regression lines fitted by method of least squares.

PERCENT FREQUENCIES OF VISIBILITIES IN GIVEN RANGES BY YEARS WITH LINEAR TREND LINE



FLUX OF VISIBILITY FREQUENCY CHANGES

FREQUENCY		NET CHANGE		FLUX OF RESULTANT CHANGES
1966	1975	66	75	

7.7	-2.2	-9.9	+	0 = -9.9
67.8	81.2	+13.4	+	-9.9 = 0
14.9	15.2	+0.3	+	-3.5 = -3.5
8.4	4.8	-3.6	+	-0.2 = -3.8
1.8	1.6	-0.2	+	0 = -0.2

Figure 3 Percent frequencies of visibilities in given ranges by years (left) and schematic shift of visibility frequency changes (right) at Subang airport for 1966—75. Linear regression lines fitted by method of least squares.

TABLE 1  
 PERCENTAGE OCCURENCES OF VISIBILITY AT SUBANG  
 AIRPORT IN FIVE RANGES FOR PERIODS 1966-70  
 AND 1971-75 WITH WIND DIRECTIONS IN THE  
 SECTOR 35°-135°

Period	Visibility Category					Number of occasions
	0—4 miles (0.0—6.4 km)	5—9 miles (8.0—14.4 km)	10—14 miles (16.0—22.4 km)	15—19 miles (24.0—30.4 km)	≥ 20 miles (≥ 32.0 km)	
1966—70	1.4	6.8	15.2	71.6	5.0	3269
1971—75	1.9	0.6	14.4	77.5	0.6	1526

(Source: Malaysian Meteorological Service)

TABLE 2  
 PERCENTAGE OCCURENCE OF VISIBILITY AT SUBANG  
 AIRPORT IN FIVE RANGES FOR SIX OVERLAPPING  
 PERIODS OF FIVE YEARS WITH WIND DIRECTIONS  
 IN THE SECTOR 35°-135°

Period	Visibility Category				
	0—4 miles (0.0—6.4 km)	5—9 miles (8.0—14.4 km)	10—14 miles (16.0—22.4 km)	15—19 miles (24.0—30.4 km)	≥ 20 miles (≥ 32.0 km)
1966—70	1.4	6.8	15.2	71.6	5.0
1967—71	1.7	6.5	14.4	75.8	1.6
1968—72	1.8	5.4	14.5	78.0	0.3
1969—73	1.8	4.8	13.8	79.4	0.2
1970—74	1.7	5.0	12.9	80.0	0.4
1971—75	1.9	5.7	14.4	77.5	0.5

(Source: Malaysian Meteorological Service)

Another possible alternative, however, would be that changes of distribution of winds according to speed or from month to month might contribute to the production of changes in the distribution of visibility. It was therefore decided to examine these relationships in greater detail. Table 3 shows the annual average distribution of visibilities for the two five-year periods for three ranges of wind speeds. Results generally confirm those presented in Tables 1 and 2 particularly in the visibility range of  $\geq 32.0$  km ( $\geq 20$  miles).

The percentage frequencies of visibilities in given ranges during the 1966—75 decade and the schematic shift of visibility frequency changes with directions in the sector 35° — 135° at Subang Airport are shown in Figure 3. There are some rather large variations from year to year, but as a whole the linear regression lines, fitted by the method of least squares, depict the general trend in each range fairly well. There is, however, no clear trend of improving or deteriorating visibility. The frequencies in the two lowest visibility ranges and those in the highest ranges are decreasing,

TABLE 3  
ANNUAL PERCENTAGES OF WIND SPEED OCCURRENCES IN  
THE SECTOR 35°—135° AT SUBANG AIRPORT WITH  
VISIBILITIES IN FIVE RANGES FROM PERIODS  
1966-70 and 1971-75

Wind Speed	Period	Visibility Ranges					Number of Occasions
		0—4 miles (0.0—6.4 km)	5—9 miles (8.0—14.4 km)	10—14 miles (16.0—22.4 km)	15—19 miles (24.0—30.4 km)	≥ 20 miles (≥ 32.0 km)	
1—3 knots (0.5—1.5 ms <sup>-1</sup> )	1966-70	1.0	6.3	17.6	71.0	4.1	1667
	1971-75	1.4	5.9	17.3	74.8	0.6	1002
4—6 knots (2.1—3.1 ms <sup>-1</sup> )	1966-70	1.5	6.7	16.1	69.7	6.0	1046
	1971-75	1.1	7.1	10.6	80.6	0.6	350
≥ 7 knots (3.6 ms <sup>-1</sup> )	1966-70	2.7	6.5	10.6	74.3	5.9	526
	1971-75	4.9	7.4	9.3	78.4	0.0	204
All Speeds	1966-70	1.5	6.5	16.0	71.1	4.9	3239
	1971-75	1.8	6.4	14.7	76.5	0.6	1556

(Source: Malaysian Meteorological Service)

TABLE 4  
 THE RESULTANT SHIFT OF VISIBILITY (IN PERCENT)  
 AS DETERMINED BY THE METHOD DUE TO HOLZWORTH  
 AND MAGA (1960) FOR SUBANG AIRPORT, BY  
 MONTH, 1966-75

Trend Characteristics	J	F	M	A	M	J	J	A	S	O	N	D
Total shift downward to lower visibility	27.3	26.7	36.3	27.0	74.1	6.1	14.1	12.7	0.0	20.1	31.2	34.7
Total shift upward to higher visibility	25.3	26.3	0.0	10.5	1.1	10.6	1.0	4.2	22.0	6.0	15.9	0.0
Resultant shift of visibility*	2.0↓	0.4↓	36.3↓	16.5↓	73.0↓	4.5↑	13.1↓	8.5↓	22.0↑	14.1↓	15.1↓	34.7↓

\* deteriorating visibility trend is shown thus (↓)  
 improving visibility trend is shown thus (↑)

(source: Malaysian Meteorological Service)



while those in the 16.0—22.4 km (10—14 mile) and 24.0—30.4 km (15—19 mile) ranges are all increasing. The schematic shift of visibility frequency changes on the right side of Figure 3 nevertheless indicates that, on the average, there has been a slight trend of deteriorating visibility during the 1966—75 period amounting to 2.4 percent.

Similar analysis have been undertaken for each of the months during the 1966—75 period; the results are shown in Table 4. These indicate that the patterns are more divergent. On the average, however, there has been a deteriorating trend ranging from 0.4 percent in February to 73.0 percent in May.

## Conclusion

Although evidence were still largely inconclusive, on the average, however, there was a slight trend of deteriorating visibility during the 1966—75 decade particularly in the visibility range of  $\geq 32.0$  km ( $\geq 20$  miles). The steady growth of urbanization and industrial development within and around Kuala Lumpur — Petaling Jaya during the last five or six years, coupled with the absence of any form of smoke control measures, have probably been the major contributory factors.

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# SOME ISSUES CONCERNING BEHAVIOUR MODIFICATION IN THE SCHOOLS

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## SYNOPSIS

*This paper highlights some of the major issues pertaining to behaviour modification in the schools. Among the philosophical, conceptual and methodological issues continually raised in discussions, it appears that the philosophical ones are dominant. It has also been argued that many techniques that have been developed are indiscriminately applied to educational settings; also, these are limited in their conceptualization and it may be questioned as to their effectiveness for classroom applications. The present trend towards "behavioural humanism" is both interesting and challenging to researchers and practitioners, and it is concluded that research on "normal" children in actual situations, attempting to bring to bear more realistic approaches, would be more meaningful and relevant.*

## SINOPSIS

*Artikel ini mengemukakan persoalan-persoalan utama mengenai pengubahan tingkahlaku di sekolah-sekolah. Walaupun persoalan-persoalan filosofi, konsepsi, dan metodologi sering ditimbulkan dalam perbincangan-perbincangan tetapi yang lebih ditekankan ialah persoalan-persoalan filosofi. Telah juga dipersoalkan, bahawa beberapa teknik telah dimajukan dan diaplikasikan dengan melulu dalam situasi-situasi pendidikan. Teknik-teknik demikian agak terhad dari segi konsepsi, lantaran itu keberkesanannya di dalam amalan-amalan pendidikan bolehlah dipersoalkan. Trend semasa terhadap "humanisme behavioral" adalah menarik dan menjadi cabaran kepada sama ada pengkaji-pengkaji dan pengamal-pengamal, dan adalah disimpulkan kajian-kajian ke atas kanak-kanak "normal" dalam situasi-situasi sebenar yang cuba meneroka pendekatan-pendekatan realistik, pasti akan menjadi lebih bermakna dan relevan.*

This paper attempts to look at some of the issues in behaviour modification, particularly pertaining to the interventions in the schools, and to discuss attempts at resolving some of these issues or suggestions at their resolution. It is not an attempt at an exhaustive literature review, but rather an examination of some of the more pertinent questions in an aspect of education.

## **The concept of Behaviour Modification**

There are as many views about behaviour modification as there are theories about behaviour. The most popular usage of the term “behaviour modification” refers to the technology which has its origins in the work of B.F Skinner and other Stimulus-Response (S—R) psychologists. The traditional paradigm of behaviour modification is based on laboratory research with infrahuman subjects. Essentially, there are two paradigms — the operant paradigm based on the works of Skinner and others, and the classical paradigm based on the work of Pavlov. The application of behaviour modification techniques has spread to many human activities ranging from mental hospitals and prisons to industry and schools. The popularity of the technique stems from its apparent simplicity, the reported success rates which have been normally high, and perhaps the dominance of behaviorism in American psychology until recent years. In education, the reported success rate, especially with “unreachable children”, coupled with the teachers’ desperate need for some technique that works, has contributed to its popularity (Mac Millan, 1973).

Basically, the behaviour modification adherents address themselves to response probability, reinforcement, schedules of reinforcement, feedback, etc.,. Behaviour is viewed as observable, identifiable, quantifiable, and functionally related to external variables and personal history (Rhodes & Tracy, 1974). Carefully developed procedures are usually designed to “control behaviour”. Such procedures might involve any one or any combination of the following — rewards, contingency contracting, modeling, punishment, extinction, desensitization, etc.,. (Clarizio, 1971).

## **Issues in behaviour Modification**

Recently, with increased research and applications of the behaviour modification technology, many issues have been raised, and are still being raised, particularly with respect to its theoretical and philosophical assumptions, the methodology, and the indiscriminate applications in a variety of situations. Although behaviour modifiers assume that behaviour modification is an effective technology, some people view the technology fraught with conceptual difficulties. For instance, it is not well-established that it is the reinforcement that makes it work, or yet other unknown processes. Mac Millan (1974) pointed out that the simplistic definition of “reinforcement” as “anything that increases the probability of behaviour” might well apply to infrahuman subjects, but has limited value with human subjects, particularly in dealing with covert and unconscious “confirming responses”. Moreover, some scientists like Chomsky see the apparent circularity in Skinner’s definition of reinforcement.

Apart from theoretical and scientific posers, there have also been raging philosophical debates, for instance T.W. Wann’s *Behaviorism and Phenomenology* (1964). Part of the debate revolves around the

concept of freedom and control. Assuming that behaviour technology is potentially effective, the question arises as to who should control who and with what intent and outcomes. There is a widespread fear that the technology might fall into the “wrong” hands.

Skinner’s recent work, *Beyond Freedom and Dignity* (1972), in defense of the control and freedom issue, has been criticized by many quarters. For instance, it has been pointed out that he views education as “behaviour control in the service of cultural survival,” (e.g. Kohlberg, 1972; Hartfield, 1973). Psychologists à la-Skinner have been criticized for being “culture designers” who give advice about means (implying choice of ends), thereby maintaining the system (Kohlberg, 1972). In sum, some of the issues raised in recent years have been or are:-

- a) behaviorism formulates behaviour simply as a set of responses to stimuli, thus representing a person as an automaton, robot, puppet, or machine,
- b) it does not attempt to account for cognitive processes,
- c) it has no place for interior or purpose,  
and
- d) it limits itself to the prediction and control of behaviour and misses the essential nature of man, and so on.

Skinner (1974) carefully confronted all the above issues in his new book, *About Behaviorism*. On the question of control he explained:

The design of human behaviour implies, of course, control and possibly the question most often asked of the behaviorist is this: Who is to control? The question represents the age-old mistake of looking to the individual rather than to the world in which he lives. It will not be a benevolent dictator, a compassionate therapist, a devoted teacher, or a public-spirited individualist who will design a way of life in the interests of everyone. We must look instead at the conditions under which people govern, give help, teach, and arrange incentive systems in particular ways. In other words, we must look to the culture as a social environment. Will a culture evolve in which no individual will be able to accumulate vast power and use it for his own aggrandizement in ways which are harmful to others? Will a culture evolve in which individuals are not so much concerned with their own socialization and fulfilment that they do not give serious attention to the future of the culture? These questions, and many others like them, are the questions to be asked, rather than who will control and to what end. No one steps outside the causal stream. No one really intervenes.... (p. 206). (Sic)

Other psychologists with the traditional humanistic orientation see some problems with this kind of thinking. They see Skinner as evading the major issue. They assert that man must be free to grow, to self-actualize, to be creative, self-disciplined, and so on. (e.g. Rogers, 1961, Maslow, 1961).

## **Applications of Behaviour Modification Technology to Education**

The debates on behaviorism are perhaps unending and beyond the scope of this paper. What is more pertinent is the question of its application to educational and similar settings, and the implications, problems, and questions deriving therefrom. One of the persistent questions arising out of the application of behaviour modification procedures in the schools, particularly in the classrooms, has been that of the nature of reinforcements. The number of persuasive works that describe and prescribe behaviour modification technology to teachers, counselors, and other adults dealing with children, has been growing in recent years. Such prescriptions are based on experimental laboratory research with animals and humans (e.g. Bandura, 1969; Ullmann & Krasner, 1965; Madsen & Madsen, 1970; etc.). Joyce & Weil (1972) suggest, among others, a teaching or instructional model based on behaviour modification approaches, which includes programmed instruction, and contingency management for deviance behaviour. Too often in such prescriptive works, material or extrinsic rewards (reinforcements) are prescribed, especially in dealing with deviants, lower class, and culturally different children. O'Leary & Drabmen (1971) reviewed studies on token reinforcement programs in classrooms for the past decade, and pointed out that most of the 100 programs established from 1964 emerged with extensive backup reinforcement systems designed to improve social and academic behaviours of children "who were minimally influenced by classroom reinforcers such as stars, grades, and teacher attention." The effectiveness of the programs were evaluated in terms of their probability of modifying (a) decrease in disruptive behaviour, (b) increase in study behaviour, (c) increase in academic achievement, and (d) changes in other behaviours not selected as targets for remediation.

Many people view such intervention attempts as an imposition of middle-class standards and values, thereby raising the issue of bribery and corruption. Related to this is the issue of the definition of "desirable behaviour," "reinforcement" etc.,. The cognitively oriented psychologists say that, in dealing with humans, reinforcement has an element of subjectivity which must not be ignored. Baumeister (1969), for instance, pointed out that there were little convincing work done by behaviour modifiers on more complex behaviours of cognition, socialization, and acculturation. Much has been done with subjects functioning at immature levels, for example mental retardates and emotionally disturbed, or dealing with behaviours that have well-defined response topographies like seat-sitting, talking out of turn and so on. Generalizations of such findings have limited value since human behaviour is more complex than what is often viewed in the behaviouristic paradigm. Notions of expectancy, assimilation, accomodation, as discussed by cognitively oriented psychologists, cannot be easily dismissed.

Some educators also express concern with the misuse of power by teachers once they have a workable tool, especially if they are not aware of the implications and the ethics involved. Other educators see the weakness in the behaviour modification model in its inability to provide direction in

determining goals (e.g. Mac Millan, 1973).

There are others who object to the use of behaviour technology on the grounds that little research has been done in actual classroom settings involving teachers (Dunkin & Biddle, 1974). The authors identified some twenty-seven different studies involving teachers conducted between 1965 and 1971 which dealt with different aspects of classroom management. Different modes of reinforcement, such as teacher praise, material incentives, extrinsic tokens, response manipulation, peer manipulation were used. Many of these studies dealt with deviant or problem children at the primary levels, often from low socio-economic groups. These authors commented that it was not possible to attribute the success of the experiments to reinforcements alone because the treatments were confounded in that teachers also provided explanations, encouragement and modeling. The review reported that teacher praise, often recognized as positively reinforcing, was a weak stimulus and that the relationship between reinforcement schedules, learning and subsequent retention in classroom teaching was much too complex. In conclusion, the authors pointed out (Dunkin and Biddle, 1974:174):

We find the notion of positive and negative reinforcement reasonably clear and the reinforcement paradigm simple to understand. Moreover, we suspect that reinforcement *can* be used by teachers to obtain control over difficult pupils who persist in imposing behaviour problems on the classroom, and that *praise* is probably the best form of reinforcement to use on balance. At the same time, we doubt that this tradition has much to say about the larger problems of classroom management, nor has much information yet been provided that tells the teacher how to encourage self-control in problem pupils.

While it is conceivable that Dunkin & Biddle (1974) were incomplete in their review in the sense that much of the research on behaviour modification not directly involving classroom teachers were ignored, it can be surmised that with such complex procedures (e.g. Hewett, 1967) the problem of management for the whole class might be somewhat solved. From the teachers' point of view, it would seem that the behaviour technology provides a more precise specification of reinforcers, greater precision for observing behaviour, and perhaps the attention provided the individual.

Realizing the need to bridge the gap between the behaviourists and the humanists on issues of self-determination, self-control, self-discipline, and so on, some psychologists attempted to investigate in terms of the self-paradigms (e.g. Kanfer, 1970; Watson & Tharp, 1972; Meichenbaum & Goodman, 1971; Bolstad & Johnson, 1972; Zimmerman, 1975). Watson & Tharp (1972) demonstrated that through teaching college students self-management principles within the behavioristic model, the students were able to eliminate a variety of self-defined undesirable behaviours, substitute or increase desirable behaviours, overcome anxiety, etc.,.

Zimmerman (1975) pointed out the possibility of self-controlling feelings by contingency management procedures. In spite of the methodological shortcomings, it appears that such procedures have shown some promise with college and adult populations and therefore merit further investigation. It was partly an answer to the call by Miller (1970) to "give psychology away." However, the extent to which such self-management and self-control principles could be given away to younger students is still an empirical question.

Whatever the controversies generated in behaviour modification as a technology in education, it is not difficult to see its potentially powerful impact on educational practice. The simplicity of its procedures is more apparent than real. The demonstrable clarity of outcomes, which has had a wide appeal, is nevertheless fraught with theoretical and methodological difficulties. To what extent the technology can be imparted to potential users is not clear. Mazza et al (1975) pointed out that studies of the evaluation of training effectiveness were difficult and complex and that results were not definitive.

With many people (parents, teachers, counselors, students, and others) now being exposed to behaviour modification procedures in a variety of settings, there is need for some exercise of caution. In education, for instance, teachers and counselors ought to be more selective and critical when confronted with any behaviour technology. Rather than total blind acceptance of a particular technique, one must be aware of its limitations and weaknesses and the ethics involved. Mac Millan (1973) emphasized that behaviour modification should be regarded as one of the workable tools, and it is not a perfect one at best. It is essential for a teacher or counselor to have sufficient flexibility in exploring the various techniques that are best for the child, rather than a blind acceptance of a particular technique.

The paucity of research involving actual educational or classroom situations, particularly with normal children beyond the primary grades should stimulate future investigations in this direction. The problems of self-direction or self-control, the motivational antecedents, cognitive styles, expectancy effects, etc., that relate to the behaviour of humans need to be pursued further in the educational contexts. Rather than bringing research results based purely on experimental paradigms to educational applications, other social science approaches need to be explored in our effort towards an increased understanding of our complex behaviours.

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