

S O C I A L   L E A R N I N G   T H E O R Y  
A N D  
S C H O L A S T I C   P E R F O R M A N C E

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ABSTRACT

The importance of the emergence of cognitive-behavioural modification paradigms is discussed with specific reference to social learning theory and the reciprocally determining interaction of intra-personal factors, behaviour and environmental influences. Examination of the literature regarding self-regulatory processes revealed that the relative efficacy of self-reinforcement to external reinforcement has not been demonstrated unequivocally. Based on research which has pointed to the need for matching subject variables with treatment regimens, a reinforcement style (self- or external) X locus of control X age multivariate experimental design was employed to assess the effects of these variables on task performance. The 2 x 2 x 2 ANOVA's revealed that matching reinforcement style with locus of control attribution enhanced task accuracy measures, but did not influence task persistence. These results conflict with previous studies and are in some contradiction to the social learning theory position which emphasises the motivational function of self-reinforcement. Possible reasons for these results are given, indicating the mitigating effects of direct feedback as to performance accuracy on task persistence. The role of classroom environment

perception is analysed in relation to the adaptive role of locus of control attribution. Finally, the results are evaluated in terms of social learning theory conceptualisations and the need for an extended multifactorial experimental design is advocated.

DECLARATION

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Master of Arts at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



GAIL ELLIOTT

This <sup>17<sup>th</sup></sup>..... day of September....., 1982.

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All that is human must retrograde if it  
does not advance.

Edward Gibbon

There are only two occurrences in life which man<sup>I</sup> claims absolute knowledge of - death and change. Of these, change is the more important for without it there remains only stasis and consequent death. The concept of change is thus fundamental to any theoretical formulation about man.

In recent years psychology has witnessed great changes or "revolution" (Mahoney, 1977a). The basic assumptions underlying various theoretical and practical frameworks are constantly being challenged, while new bases and assumptions are being advocated and new frameworks constructed. This 'revolution' can be seen both as a result of a dissatisfaction with previous theory, methodology and experimentation, as well as a growing awareness of the inadequacy of the earlier bases and practices to present-day living.

Of the more important changes are those involving the notions of determination and the search for first causes in the causal process. It is the contention of this author that social learning theory, while reflecting some of the inadequacies of so-called scientific psychology, nevertheless has incorporated some

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In the interests of parsimony, the term man has been used whenever human beings collectively are referred to. Elsewhere, the more appropriate terms people or persons have been used. In discussion of specific studies, use of the term subjects has been made. Otherwise, where possible, use of words such as individual(s), he, she, them, they, etc. occurs.

of the most important changes.

Firstly, Bandura and his colleagues (e.g., Bandura, 1977), in the presentation of a theory of interactive processes, have escaped both the psycho-dynamic view of man as internally determined (see Mahoney, 1977a) and the radical behaviourist view of man as externally determined (e.g., Skinner, 1971). This has enabled these 'cognitive-behavioural' theorists to formulate a more holistic view of man as responsible agent.

This formulation may, in a simplified way, be said to view man as being able, by virtue of awareness of self and the use of language, to 'transcend' the determining forces of biology, socialisation and environment, thereby acting in a meaningful and intentional manner. This implies that man is an interactive agent: persons interact with one another and with their environments - biological, social and physical. Individuals can thus be viewed as parts of a system in which

(a) Each part of the system has no independence outside of the other parts of the system or the system as a whole. (b) One part of the system is not acted upon by another part, but instead there is a constant reciprocal relationship. There are no cause - effect relationships, but transactions. (c) Action in any part of the system has consequences for other parts of the system.

(Pervin, 1968, p.64)

Secondly, the search for cause - effect relationships, for first causes, is explicitly dismissed as the futile, "unproductive pursuit of the psychological Grail" (Bandura, 1981, p.30). It is thus clear that social

learning theory has moved away from some of the major concerns (and disadvantages) of earlier frameworks. The reductive trend associated with the search for first causes and unilateral determining forces, is replaced by the search for determining interactive processes. Moreover, as part of the behaviour therapy framework, social learning theory can be seen as an attempt to find 'complex solutions' for 'complex problems' (Hersen, 1981).

More specifically, this relatively recent 'revolution' is seen to be the assimilation and integration of two historically very distinct paradigms (Bandura, 1977, 1978; Dember, 1974; Kazdin, 1979; Mahoney, 1977a, 1977b, 1979; Meichenbaum, 1977, 1979). The first of these representing 'internalism', being broadly based upon subjective interpretation of human functioning and "focusing on cognitive and affective intrapersonal processes" (Mahoney, 1977a, p.5), as exemplified by psycho-dynamic and analytic psychologies. The other representing observable behaviour and focusing only on those phenomena which can be verified, being based on the belief of objectivity in dealing with human functioning and as exemplified by the radical behaviourist school. These two traditions have, and still largely do, maintained a state of archrivalry, a position of "mind creates reality" versus "environmental influences ... determines what people will attend to" (Bandura, 1978, p.345).

The integration of these two positions, as seen

in Bandura's social learning theory (Bandura, 1977, 1978), Meichenbaum's cognitive-behavioural modification (Meichenbaum, 1977) and Mischel's cognitive social-learning theory (Mischel, 1973) focuses attention on the individual's cognitive activities and behaviour patterns, studied in relation to the specific conditions that evoke, maintain and modify them. These conditions are in turn altered and modified by the individual's cognitive activities and behaviour patterns (Morris, 1979).

Thus, there is a causal circularity (or reciprocal determinism) whereby thoughts, affect, behaviours, other personal factors and environmental influences are all mutually interlocked, being mutually influential and interactive. In this formulation, the 'self' refers to "cognitive structures that provide reference mechanisms and a set of sublimations for the perception, evaluation and regulation of behavior" (Bandura, 1978, p.348) while the 'environment' refers to the individual's "cognitive representations of his/her environment rather than to the environment per se" (Meichenbaum, 1977, p.7) as well as to situations that provide information "to the person for processing" (Morris, 1979, p.II). Moreover, "people largely serve as environments for each other" and people, by their actions, "create, alter, and destroy environments" (Bandura, 1978, p.31). These researchers are, therefore,

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(Lieberman, 1979, p.370)

Mischel (1973), for example, has identified five person variables that are involved in the perception and interpretation of, and reaction to, situations. Moreover, these variables are likely to operate consistently across situations. These are: (i) cognitive and behavioural construction competencies which afford individuals the capacity or potential for generating a variety of ways of perceiving, interpreting and responding to social situations; (ii) encoding strategies and person constructs which refers to the specific ways in which the individual processes available information and uses it to form interpretations of environmental events; (iii) behaviour-outcome and stimulus-outcome expectancies which refers to the expectancies the individual holds concerning the consequences of particular behaviours and the reinforcements available in particular social settings; (iv) subjective stimulus values which are the values the individual places on various situations, potential consequences of behaviour and incentives; and (v) self-regulatory systems and plans which include self-imposed goals, standards, and the reinforcements which are operative in a situation, as well as the organised plans for initiation, sequencing and termination of complex behaviour (Mischel, 1968, 1973; Morris, 1979).

Importantly, Mischel has conceptualised these person variables as consistent cognitive and behavioural

processes rather than static qualities of the individual which have been acquired through direct and vicarious social-learning experiences and are modifiable by current environmental forces.

#### Self-regulation and self-reinforcement

Within this view of individuals as intentional agents interacting with their social and physical environments, the notion of self-regulation or self-control becomes very important. Control is said to be

vested to a large extent in the hands of the individuals themselves: They arrange the environmental inducements for desired behavior; they evaluate their own performances; and they serve as their own reinforcing agents.

(Bandura, 1974b, p.863)

Most socialisation processes involve the training of stringent social rules and encourage adherence to these rules. An individual's adoption and enforcement of these rules or self-regulatory standards is often taken as an indicator of the effectiveness of this training. It is held that successful socialisation requires the substitution of self-monitoring reinforcement systems in place of the externally imposed rules and rewards. In order to achieve this self-regulation, individuals have to adopt the imposed standards of behaviour and substitute self-administration of reinforcers (positive or negative) for external reinforcement for adherence to these standards (Bandura, Grusec & Menlove, 1967; Allen & Liebert, 1969).

The roots of this formulation are found in Skinner's (1953) postulation of self-control which hypothesised that individuals exercised control over their actions through the process of administering rewards (or punishments) to themselves in the absence of external constraints. The current view, while largely based on this hypothesis, stresses the process of the self-regulatory mechanism rather than the 'absence of external constraints'. This can clearly be seen in the formulation of the following two self-regulatory models.

Bandura (1977, 1978) has proposed a three-component process model for the regulation of behaviour by the self. Initially there is the process of self-observation in which the individual attends selectively to certain aspects of his/her behaviour. This is followed by the process of self-reaction in which those actions that meet or exceed internalised standards are judged favourably and those that fall short are judged as unsatisfactory. The final process is that of self-response. Here, those actions judged favourably are rewarded whilst those judged unsatisfactory are self-punished. The interdependence of these three processes is readily apparent - without self-observation and subsequent self-reaction there can be no self-reinforcement. (For an illustration of these processes, see Appendix I).

Kanfer (Kanfer & Karoly, 1972) has proposed a similar model. Like Bandura, he maintains that there

are three steps in the self-regulatory process:

(i) the individual accurately monitors the effects of his/her behaviour in terms of overt and covert response-produced (reactive) cues - self-monitoring; (ii) this performance feedback is then compared to a standard that is presumed to be the product of direct-training, social norms, previous reinforcement and the person's own expectations and motivations for success - self-evaluation; and, (iii) the person, as a result of this comparison process, self-reinforces, either positively or negatively - self-response. What is, perhaps, the most important feature of Kanfer's model is his inclusion of a fourth stage in the self-regulatory sequence, a feedback stage, in which self-reinforcement (self-response) is shown to influence future behaviour.

Research support for these models has been of a conflicting nature. The research concerning Bandura's proposed model has concentrated mainly on the three processes involved or on the variables he includes in his definition of self-reinforcement. As such, this research will be discussed later. Research concerning Kanfer's proposed model has not occasioned as much interest. However, there has been some support afforded to the processes involved (Kirschenbaum & Karoly, 1977).

These two models - Bandura's triadic reciprocal determinism and Kanfer's three-stage closed-loop feedback system - closely parallel one another. Most significantly, they allow for the inclusion of motivation in the self-

regulation or self-reinforcement process.

Bandura's triadic determinism position holds that any action, its observation, judgement and subsequent response will affect future actions. Kanfer states that self-response, resulting from self-monitoring and self-evaluation will influence future self-monitoring, self-evaluation and self-response, at which point the cycle begins again. The formulation of these two models thus maintains a view of man as active agent, the ever-changing product of social interaction, thought, experience, emotion and environment.

#### Defining self-reinforcement

In keeping with his proposed model of self-regulation, Bandura (1969, 1974b, 1976a, 1976b) has defined self-reinforcement as the process by which individuals regulate their behaviour by making self-reward conditional upon matching or exceeding self-prescribed standards of behaviour. In addition to this, Bandura has stipulated a number of properties that define the self-reinforcement process. These include: (i) a self-prescribed standard of behaviour which serves as the criterion for evaluating the adequacy of a performance; (ii) that the reinforcers are under the full control of the individual and that these reinforcers are freely available; (iii) that performance standards are adopted and internalised for determining the occasions on which a given behaviour warrants reinforcement; and

(iv) that the individual serves as his/her own reinforcing agent (Bandura, 1977; Bandura & Perloff, 1967).

In the research and theorising, a number of different labels have been applied to the self-reinforcement process: contingent self-reward has been termed self-reward, self-praise or self-congratulation, while non-contingent self-reward has been labelled self-gratification, cheating or stealing. Contingent self-criticism has been called accurate or appropriate self-appraisal, while non-contingent self-criticism has been styled as masochism or low self-concept.

Across all these labels, however, there is one unifying characteristic, namely, that the behaviour patterns so-labelled result in either self-rewarding or self-punishing consequences for the individual. Thus, although authors differ somewhat in their conceptualisations of self-reinforcement, they commonly agree that the acquisition and management of the self-reinforcement process is achieved through the delivery of self-reinforcers dependent on appropriate behaviour (Bandura, 1976b, 1977; Jones & Evans, in press; Jones, Nelson & Kazdin, 1977; Jones & Ollendick, in press; Masters & Mokros, 1974). These different conceptualisations may be summarised as

self-reinforcement occurs when, in the relative absence of controlling influences, an individual has full control over available reinforcers but freely imposes certain contingencies for the self-administration of the reinforcing stimuli.

(Jones, Nelson & Kazdin, 1977, p.151)

In keeping with the cognitive-behavioural view of man, as postulated here, it is important to note that self-reinforcement is not "conceptualized as an autonomous regulator of behavior" but as a "source of influence that operates in conjunction with environmental factors" (Bandura, Mahoney & Dirks, 1976, p.5). In connection with this and with Catania's (1976) criticism, the concept of self-reinforcement has recently been reformulated to encompass the notion that as "consequences enhance behavior through their incentive motivational function" and as earlier concepts of reinforcement clouded the issue of self-reinforcement, it would be "more fitting to speak of regulation than of reinforcement" (Bandura, 1976b, p.153). We, therefore, have the statement that as

personal and environmental factors  
affect each other through an inter-  
active process, self-directed  
influences do not act as autonomous  
regulators of behavior.

(Bandura, 1981, p.31)

In view of this reconceptualisation, it is clear that previous formulations of the role of reinforcement have been challenged in many ways: Firstly, the cognitive-behavioural theorists maintain that it is not the reward itself that is reinforcing, but the cognitive anticipation of that reward (Bandura, 1976a). This anticipation involves: awareness of the reward, past experience, observations of the environment or situation, and the emotional belief that the reward will occur. Secondly, as cognitive anticipation precedes

behaviour and as reward depends upon standard of performance, reinforcement is directly related to how a specific behaviour is evaluated (Bandura, 1976b, 1977). Finally, as reward depends upon performance standard and as the individual already possesses the prescription for that standard, self-reinforcement in the self-regulatory process possesses a very important motivational function and does not have as important an informative function (Bandura, 1976b).

Radical operant theorists have argued strongly against the social learning, cognitive-behavioural position. They claim that self-regulatory (or self-reinforcement) responses do not cause or explain conditional behaviour changes (Rachlin, 1977a, 1977b); that the response of controlling one's own behaviour is itself maintained by external reinforcement in the form of such things as social praise and physical rewards (Skinner, 1953, 1974); and that contingent reinforcement depends upon an independent (external) definition of a response as meeting the performance requirement (Goldiamond, 1976).

In reply, social learning theorists have claimed that although they recognise the role of external agencies in the acquisition and maintenance of self-reinforcement behaviour (see Jones, Nelson & Kazdin, 1978), nevertheless cognitive self-appraisal and self-reinforcement do influence behaviour directly (Bandura, 1976b, 1978, 1981). This debate continues. For example,

Spiedel and Tharp (1980), in a recent article, conclude that their study shows that "self-reinforcement appears to be the myth" that operant theorists claimed it to be (p.20). Their study can be criticised on a number of grounds, mainly in terms of their claim that freely available rewards are not contingently used unless in the presence of some external, inhibiting influence - a claim that social learning theorists have never made. From the first conceptualisations of self-reinforcement processes it has been recognised that, unless in the presence of an external agency, contingent self-reinforcement will often not occur (Bandura & Mahoney, 1974). It is thus important to consider Bandura's concluding remarks in a recent article, and to evaluate these remarks as probably expressing a more realistic attitude toward man:

However intolerable thought processes might be to radical behaviorists, the fact remains that people do think, and can influence through thought what they will do. To acknowledge that people can exert some influence over their own behavior is not to raise the specter of autonomous agency. Rather it fosters lines of research that deepen understanding of how environmental and self-influence interactively determine the course of human behavior.

(Bandura, 1981, p.38)

In conclusion, the importance of these 'thought processes' and the operant versus cognitive positions are highlighted and humorously summarised in the following anecdotal extract:

Howard Rachlin and I (M.J. Mahoney) were recently co-presenters at a symposium on

self-control ... After several hours of debate, Howard said that he was willing to admit that he thought, but unwilling to grant that his thoughts affected his behavior. I paused momentarily and then asked him if that included his writing behavior. He said "Yes" and I quickly announced, "The defense rests".

(Mahoney, 1977, pp.676-677)

#### Self- and external reinforcement

To adopt the above line, however, still leaves the question open as to whether self-reinforcement parallels the motivational and other facets of external reinforcement. The problem, thus stated, has two aspects: firstly, if self-reinforcement is similar to external reinforcement, and secondly, if this is so, which of the two is more effective in changing and/or maintaining behaviour.

Montgomery and Parton (1970) were probably first to investigate directly whether self-reward is, in fact, reinforcing. Although their study has been criticised as an inaccurate reflection of self-reinforcement behaviour because of the demand characteristics operating in the experimental situation, they were the first investigators to empirically demonstrate that self-reward has a reinforcing function.

Premack and Anglin (1973), while maintaining that Bandura and Perloff (1967) have demonstrated the reinforcing properties of self-reward, caution against the generalisation of such studies. They state that

before attempting to determine whether an event is self-rewarding or not, researchers have to show (a) that the event is a reward (or punishment) in the classical, operant manner, and (b) that the subject gave the reinforcer to him/herself.

With reference to self-reinforcement and motivation, Spiedel (1974) was one of the first investigators to demonstrate that self-reward can function so as to motivate behaviour in a manner similar to that of externally imposed contingencies. She too has advised against liberal generalisation of these results, maintaining that other self-regulatory behaviours already present in the subject's repertoire may have influenced their self-reinforcement behaviour in the experimental setting and that the appropriate levels of attractiveness of the reward have to be taken into account, as these may have a differentially motivating effect for each subject.

The literature with regard to the second aspect of the problem is far more extensive. In this connection, Bandura (1974a) has stated that a complete understanding of the self-reinforcement (or self-regulation) process involves two separate lines of research. The first of these is designed to explain how behavioural standards for self-reinforcement are acquired and maintained, and the second is designed to assess whether self-administered consequences do, in fact, serve a reinforcing function by influencing response output.

This second line of research differs from an examination of whether self-reward is reinforcing in that it involves an investigation of whether or not "behavioral productivity can be enhanced as effectively by self-reinforcement as by externally administered consequences" (Bandura, 1974a, p.301).

Most theorists have stated that self-reinforcement is as influential in regulating behaviour as is external reinforcement and research has demonstrated that self- and external reinforcement are equally effective over a wide range of behaviours, subjects and settings (Bandura & Perloff, 1967; Felixbrod & O'Leary, 1973, 1976; Johnson, 1970; Liebert, Spiegler & Hall, 1970).

As Barling and Patz (1980) state: "that this phenomenon should prevail is surprising as social-learning theory predicts that self-administered consequences may be more effective (Bandura, 1976)" (p.80). They argue that research demonstrating self- and external reinforcement to be equally effective probably reflects an inadequate operationalisation of social learning theory, and therefore, they advocate the need for a factorial experimental design which accounts for those variables extending beyond the agency of reinforcement. This prescription is based on the notion that differences between self- and external reinforcement emerge prior to the administration of the reward, and is linked to the neglect of individual differences. Specifically, Barling and Patz (1980) demonstrated that

children who attribute their rewarded responses to internal processes benefitted from self-reinforcement procedures, whereas their counterparts, believing their behaviour to be externally controlled, benefitted from external reinforcement procedures. Moreover, this phenomenon was a function of age and indicates the importance of locus of control factors, both important components of social learning theory.

An associated problem is that of the influence of external variables in the self-reinforcement/self-regulation process. Behaviour can be, and is, maintained in the absence of external controls. However, the importance of external controlling and mediating agencies is not diminished by recourse to individual control of behaviour. For example, the acquisition of self-reinforcement standards is heavily dependent on the internalisation of external control standards (Bandura & Kupers, 1964; Bandura & Whalen, 1966).

Probably the largest body of research in this area has been conducted by Jones and his associates (Jones, unpublished manuscript; Jones, 1980; Jones & Evans, in press; Jones, Nelson & Kazdin, 1977; Jones & Ollendick, in press), who maintain that an examination of the role of external variables in the self-reinforcement process is important as investigators, while acknowledging the role of external variables, "strongly imply that the self-delivery of consequences is responsible for behavior change rather than specific external contingencies

operating in the experiment" (Jones et al, 1977, p.151).

This means that the self-reinforcement process remains a plausible rival to interpretation of results, such as that of response-chaining (Catania, 1976). According to Jones and his associates, variables that may affect the self-reinforcement process include the history of the subject; the criterion for performing the target response; self-monitoring; surveillance by an external agent; instructional sets in the experiment; and directly imposed contingencies, either for the self-reinforcement response or for the target response on which the self-reinforcement is based. A short description of each of these is necessary:

History refers to those events in the experiment that precede participation in the self-reinforcement process and involves prior training in the investigation.

Criterion-setting refers to the specification of the behavioural goal of the investigation to the subject. This variable includes the effects of goal-setting, effects which may influence the behaviour change process independent of self-reinforcement (Marston, 1964; Martin, 1979, 1980). Bandura (1981), however, maintains that this influence also applies to external reinforcement as changes produced by external reinforcement are "partly determined by covert goal-setting and internal standards" (p.32).

Self-monitoring refers to the observation and

recording of aspects of one's own behaviour. In many investigations, this variable has been found to effect behaviour change independent of self- or external reinforcement (Jones et al, 1977; Rosenbaum & Drabman, 1979).

Surveillance refers to the fact that in most investigations an external agent, in some way, monitors the subjects' behaviour, and may therefore, serve as a cue for a particular performance by indicating the self-reinforcement standard. According to Bandura (1981) this applies to investigations of external reinforcement as well. Moreover, it applies to the real-life situation as "social and tangible rewards are not dispensed in a social vacuum" (p.32).

Instructional sets: In most self-reinforcement studies, the subject is provided with explicit instructions regarding the target response and the performance standard that has to be met. This reduces the extent to which the subject can be said to self-direct his/her behavioural responses. Bandura and Simon (1977), however, have demonstrated that sometimes subjects will disregard or modify the given instructions, thereby creating (setting) their own performance standards. Nevertheless, instructions do become part of the self-prescription standard and thereby influence the self-reinforcement process.

External contingencies refers to the extent to which subjects are "free" to self-reward responses. In a large number of investigations subjects have been

instructed as to how, when and in what quantity they are to self-reward (Jones et al, 1977). However, this has been said to occur in the natural situation and thus laboratory settings utilising immediate and constrained feedback can be viewed as being more 'realistic' (Barling & Patz, 1980).

The methodological problems associated with these variables have cast some doubt on the efficacy of the self-reinforcement/self-regulation conceptualisations. As has been indicated, however, this does not necessarily imply that self-reinforcement is inoperative. Rather, avenues for further research and theoretical formulation are indicated.

In connection with this, Jones (Jones & Ollendick, in press) has shown that external variables such as instructional sets and criterion-setting, have markedly enhanced subjects' performance. These studies have indicated that children, when given the opportunity to set their own standards for reinforcement, when given the opportunity to set their own standards for reinforcement, tend to maximise payoff, while minimising effort. An indication that has received additional support from other researchers (Barling & Fincham, in press; Winston, Torney & Labbee, 1978). Winston et al (1978) claim that this phenomenon suggests that in earlier studies, standard setting had not fallen under the control of the subject but rather under the control of (i) the investigator's instructions; (ii)

training procedures; and (iii) modelling cues. Moreover, these researchers add that "older children may be more inclined to interpret a self-reward situation as an achievement task. The child's goal would then be to meet a self-defined standard of performance rather than maximize material gain" (Winston et al, 1978, p.84).

In accord with this, Barling and Patz (1980) and Moore (1977) have indicated that self-regulation and the ability to self-reinforce contingently is a function of development. Moore (1977) has stated that this development is "the development of the ability to transform concrete arousing rewards to less arousing abstract representations" (p.83) and that this development is age specific.

#### Acquisition of self-reinforcement

According to radical behaviourist theories, new responses are acquired through the processes of successive approximations and differential reinforcement by an external agent (Skinner, 1953). In the current social learning analysis, an external agent sets a criterion standard for what constitutes a worthy performance and then consistently rewards the child for matching or exceeding this standard while non-rewarding or punishing for failure to meet the standard (Bandura, 1976, 1977).

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internalised within the child who, when subsequently given control over the reinforcers administers and utilises them in a contingent manner (Bandura & Kupers, 1964). Support for this concept, that is, that self-reward behaviour is learned directly, has been mainly derived from studies with infrahumans - pigeons and monkeys (Bandura & Mahoney, 1974; Mahoney & Bandura, 1972; Mahoney, Bandura, Dirks & Wright, 1974). Nevertheless, these studies do point to the plausibility of the direct learning postulation and, to a limited extent, indicate its applicability across subjects and settings.

With regard to human studies, Kanfer and Marston (1963a, 1963b) have demonstrated that self-reinforcement may be acquired through direct learning and that this acquisition is influenced by the length and explicit nature of the training. In support of Moore (1977), they found that frequency of self-reward behaviour was increased in the absence of external reinforcing stimuli (concrete rewards have an arousal effect) while accuracy of the self-response was increased in the presence of the reinforcing stimuli. Support for these studies, utilising self-evaluation and self-punishment, has also come from a study by Kanfer and Duerfeldt (1967) which, to a limited extent, paralleled Kanfer and Marston's (1963a, 1963b) findings.

Although the above mentioned studies have demonstrated the role of direct instruction, social learning theorists maintain that it is doubtful that people receive much

direct training on the majority of tasks they encounter. More importantly, a fundamental tenet of this position is that performance in most situations cannot be evaluated in the absence of meaningful comparisons with others. Therefore, the role of modelling and imitation in the acquisition of self-reinforcement has received a greater amount of attention from researchers.

Studies demonstrating that self-reinforcement behaviour may be readily acquired through the observation of social comparison models (Bandura & McDonald, 1963; Bandura, Ross & Ross, 1961) have led to the conclusion that self-evaluations are dependent on the extent to which that person matches the behaviour of the chosen model.

Although this imitative acquisition was initially shown to occur in the absence of direct training (Bandura & Kupers, 1964; Bandura & Whalen, 1966; Hildebrandt, Feldman & Ditricks, 1963) it is now commonly held that the adoption of a particular self-reinforcement schedule or self-evaluative standard is a joint function of both direct training and the actual behaviour displayed by the model (McMains & Liebert, 1968; Mischel & Liebert, 1969; White, 1969).

Central to this formulation is the phenomenon of 'multiple' or 'successive' modelling (Bandura, Grusec & Menlove, 1967; McMains & Liebert, 1968). One of the most common socialisation experiences is exposure to divergent standards displayed by two or more social agents

differing in the degree of indulgence they seemingly reflect. More importantly, this conceptualisation suggests that a strict social norm which is imposed on children and which is adhered to by some, but not all, of the social agents to whom the child is exposed may lose much of its effectiveness. This contention has been supported by laboratory studies (McMains & Liebert, 1968; Mischel & Liebert, 1969) which have demonstrated that when there is a discrepancy between modelled and imposed standards, subjects tend to adopt the more lenient standard. Moreover, that subjects, when exposed to two divergent models, will adopt the more recent model.

In the light of this, Marston (1965b) and Bandura, Grusec and Menlove (1967) have postulated the presence of five variables which are likely to serve as important determinants of the modelling-imitation process: (i) the model's standard for the administration of self-reinforcement; (ii) the model's rate of reinforcement; (iii) the model's apparent competence in the behaviour being evaluated; (iv) the nature of the relationship between the model and observer; and (v) the nature of the consequences accruing to the model for adherence to the modelled standard.

Support for the effects of these variables has come from a number of studies indicating the importance of consistency in modelled standard and apparent competence of the modelled behaviour (Marston, 1965b); a high level of modelled competence (Bandura & Whalen, 1966) and social

recognition for modelled competence (Bandura, Grusec & Menlove, 1967). In line with social learning theory, nurturant models are probably perceived as more tolerant of lenient standard setting than non-nurturant models, which directly influences the stringency of the adopted self-standard level (Bandura, Grusec & Menlove, 1967).

In addition to the above mentioned aspects of direct learning and modelling, the acquisition of self-reinforcement has also been shown to be task specific (Dorsey, Kanfer & Duerfeldt, 1971; Barling, 1980a, 1980b). Specifically, a high level of prior external reinforcement tends to result in more liberal self-reward standards while increased task difficulty tends to make such standard setting more conservative. In addition, task persistence is seen as reflecting a motivational aspect, for example, Barling (1980a) has argued that self-reinforcement is related "primarily to motivational variables" (p.416). In line with this, Marston (1964) has shown that subjects classified as task-orientated displayed increased frequency of self-reward behaviour when compared with subjects classified as self- or interaction orientated.

Related to this is the concept of achievement motivation. Stouwie, Hetherington and Parke (1970), defining achievement orientation as a function of initial standards for self-reinforcement, have demonstrated its inhibiting effect in the presence of lenient models. This is consistent with social learning theory which

maintains that one of the legacies of an achievement-orientated culture is the internalisation of high achievement standards for self-administration of contingent self-reinforcers (Masters & Mokros, 1974). Thus, with maturation, children learn that completion of lengthy and difficult tasks is more deserving of reward than relatively short and easy tasks (Karan, 1975). Initially, this was thought to inhibit the adoption of minimum performance requirements for self-reward (Bandura & Perloff, 1967). This assumption has been shown to be incorrect, as achievement orientation, in relation to performance standard, is both age and task specific (Moore, 1977).

The incentive value provided by the reward is also important. Earlier studies had indicated that the value of the reward was not associated with performance (see Karan, 1975). However, Liebert and Ora (1968) have demonstrated that under high incentive conditions, subjects exhibit high standards for performance. Relating this to development (maturation), Winston, Torney and Labbee (1977) have hypothesised that older children and adults possess achievement motivation as a function of the value they attribute to the reward and the higher this attributed value, the more likely that performance standards and self-evaluative prescriptions will be influenced so as to inhibit non-contingent self-reinforcement behaviour.

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In social learning theory, perceived locus of control plays a very important role in the acquisition of the

self-reinforcement process. This construct refers to the general expectancy of internal or external control of reinforcement (Phares, 1976). More specifically,

the generalised expectancy of internal control refers to the perception of events, whether positive or negative, as being a consequence of one's own actions and thereby potentially under personal control. The generalised expectancy of external control, on the other hand, refers to the perception of positive or negative events as being unrelated to one's own behavior and thereby beyond personal control.

(Lefcourt, 1976, p.29)

The general thrust of this concept seems to be that internals manifest "greater concern and attach more importance to success in skill or other self-reliant situations while externals are prone to be more motivated by chance or luck situations" (Phares, 1976, p.76). The importance of the locus of control variable in self-reinforcement acquisition is thus readily apparent: internals would presumably approach tasks as if their performance depended on their own skills and would, therefore, have increased achievement motivation.

In line with social learning theory, Phares (1976) has pointed out that behavioural responses are not inevitably strengthened through reinforcement, rather "behavior is likely to reoccur if it is reinforced in subjects who believe that there is a contingency between behavior and reinforcement in that situation" (p.28). Moreover, like Weiner (1972) and others, Phares (1976) maintains that locus of control orientation is situation specific and is aroused by the nature of the cues in

the situation rather than the general nature of the situation itself.

The results of studies based on this construct (Lefcourt, 1975; Phares, 1976; Weiner, 1972) have indicated that locus of control orientation has a direct influence on learning and performance, even though these results have often been inconsistent and in conflict. For example, Finch, Pezzuti and Nelson (1975) have shown that internal locus of control was significantly correlated with academic performance and achievement, chronological age and sex. Fincham and Barling (1978) found that when comparing children labelled as learning disabled, normal achievers and gifted, external locus of control correlated most significantly with learning disabled, while internal locus of control orientation correlated most significantly with gifted children. Phares (1976) has demonstrated that internal locus of control is related to a high degree of ability to delay gratification, but has stated that these results depend upon specific considerations, especially the experimental method utilised.

Nevertheless, these studies have pointed to the importance of teaching children that they have control over their own reinforcement. Bellack (Bellack, 1975; Bellack & Tillman, 1974) has demonstrated that, in the absence of external controls, internals are more likely to self-reinforce positively. Barling and Fincham (1978) have provided some support for this by showing that

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subjects who successfully self-modify their behaviour are significantly more internally orientated than unsuccessful self-modifiers.

These findings have a general application for the behaviour of externals as most real-life situations do not provide ongoing feedback and reinforcement. Feedback and consequent reinforcement thus have to be based on covert cues. Concerning this, Barling (1982) has demonstrated that self-determination of stringent performance standards may be more important for externally orientated children than for their internal counterparts. He attributes this to internals being "motivated on a qualitative level such that the implementation of stringent standards would be of no consequence ... (while) the relatively lower performance of externals may be enhanced by the self-determination of stringent standards, given adequate skills" (p.102).

The importance of teaching externals to self-determine their own performance standards is emphasised by Bellack and Tillman's (1974) explanation for the relatively lower standards of performance displayed by externals. They indicate that externals, attending closely to external cues, perform well on easy tasks but, when no longer able to rely solely on these cues, become anxious and perform badly. They maintain that this phenomenon is reversed with internals.

In support of this, but from a slightly different perspective, Morris and Messer (1978) and Barling and

Patz (1980) have demonstrated that internals perform better under conditions of self-reinforcement, while externals exhibit superior performance under external reinforcement conditions. They have also indicated that self-reinforcement may be more effective than external reinforcement if (a) subjects already possess a self-attributional style and (b) are of a certain age. This indication has been supported by other studies (Klein, 1976; Masters & Mokros, 1974; Wilson, Torney & Labbee, 1979).

In contradiction, however, Felixbrod and O'Leary (197) have indicated that subjects who previously determined their own contingencies performed worse than subjects whose contingencies were externally determined. Moreover, Gordon and Bolick (1979) have postulated that studies showing internal locus of control to have a high correlation with superior academic performance and self-reinforcement may reflect "the greater competence associated with internality which accounts for some of their perseverance in the face of difficulty" (p.260) and not with subjects experiences of self-reinforcement as such.

#### Generalisation, maintenance and activation of the self-reinforcement response

Crucial to any discussion of the acquisition and motivational aspects of self-reinforcement is the question of whether or not the responses and self-reinforcement standards acquired in one situation will generalise to

other response behaviours and situations. Kanfer, Duerfeldt and Lapage (1969) have demonstrated the stability of self-reward rates across tasks, while Kanfer and Marston (1963b) have demonstrated that increasing levels of difficulty on a task results in lower rates of self-reward. Bellack and Simon (1976) have shown that positive self-reinforcement is consistently emitted at a higher rate than negative or nil self-reinforcing responses in a variety of contexts.

Research with infrahuman subjects has provided some support for the postulation that self-reinforcement responses acquired in one situation are generalised to other, appropriate situations (Bandura & Mahoney, 1974; Mahoney & Bandura, 1972; Mahoney, Bandura, Dirks & Wright, 1974). With regard to this, Bandura, Mahoney and Dirks (1976) have stated that people do not uniformly self-reward or self-punish behaviours irrespective of the circumstances under which they are performed. Rather, self-reinforcement functions are discriminately activated by environmental cues that are differentially correlated with performance requirements for self-reward. With specific reference to classroom behaviour, Rosenbaum and Drabman (1979) have stated that

no one has yet been able to maintain appropriate behavior while allowing pupils to partake of reinforcement when, where, and in amounts they desired.

(Rosenbaum & Drabman, 1979, p.479)

Unfortunately, as the above studies indicate, an

adequate theoretical formulation of the generalisation of self-reinforcement behaviour across situations, substantiated by research, has, as yet, not appeared.

A number of variables have been postulated as affecting the activation of self-reinforcement responses (Bandura, 1977). These include: (i) negative consequences accruing to unmerited self-reward responses during acquisition phases; (ii) positive situational determinants, signifying post contextual cues which provide support for self-reinforcement behaviour (Bandura, Mahoney & Dirks, 1976); (iii) personal benefits resulting from self-regulation which provide natural cues for continued self-imposition of contingent positive and negative self-responses - these benefits include praise, social recognition and external rewards; (iv) modelling supports, that is, people generally choose reference groups whose members share similar behavioural standards and, thus, the individual's self-evaluations are influenced by "actual or anticipated reactions of members whose judgement they value" (Bandura, 1977, p.147); and (v) determinants of self-punishment which are maintained by their acquired capacity to "alleviate thought-produced distress and to attenuate external punishment" (Bandura, 1977, p.152).

Confounding this issue is the fact for self-reward to occur, there must be a period (or action) of self-denial or self-delay of gratification. Therefore, the individual must be equipped with a self-restraining force which allows for the abstinence from indiscriminate

self-reward (Premack & Anglin, 1973). The inferential often conflicting nature of these concepts indicates the important need for future extensive research concerning the notions of activation and maintenance of self-reinforcement behaviour.

### Self-motivation

The central role played by self-reinforcement processes in self-motivation according to the social learning self-regulation paradigm has already been referred to. Moreover, Spiedel's (1974) study demonstrating that self-reward can function so as to motivate behaviour in a similar manner to that of externally produced contingencies, has also been mentioned.

Karniol and Ross (1977) have indicated that this phenomenon may be a function of a number of inter-related and crucial variables, namely, locus of control, performance accomplishments, and attractiveness of the reward. Specifically, extrinsic factors which serve to define one's performance standard as competent, generate to some extent, intrinsic interest in the activity and this is performance specific. Switzky and Haywood (1974) have provided some support for this formulation, showing that intrinsically motivated subjects work harder under conditions of self-reinforcement - the reverse applying to extrinsically motivated subjects.

In partial support of Barling and Patz's (1980) contention that under certain conditions, self-reinforcement

may be more effective than external reinforcement, this study (Switzky & Haywood, 1974) has also demonstrated that intrinsically motivated subjects tended to set higher standards for self-reinforcement than did their externally motivated counterparts. Earling and Fincham (unpublished manuscript) have related this intrinsic motivation to the need to 'self-actualise', claiming that self-reinforcement ability and self-actualisation motivation, being positively correlated, indicates an aspect of positive mental health.

Parker, Parker and Christian (in press) and Feingold and Mahoney (1975) have indicated that the introduction of an external reward for behaviour presently being maintained by intrinsic motivation, has a tendency to enhance that behaviour performance. This finding is in some contradiction to the concept of attribution (Lepper, Greene & Nisbet, 1973) which contends that a decrease in intrinsic motivation results in a perceptual change from self- to external control and would occur prior to the reinforcement. However, Feingold and Mahoney (1975) have concluded that the locus of reinforcement dispensation - self or others - may not be a crucial determinant in the undermining or enhancement of motivated behaviour.

In partial contradiction, Barling and Patz (1980) have demonstrated that differential effects may accrue to the different loci of reinforcement, depending on the effect of variables which are functional prior to the

reinforcement, and that it is these variables which are probably crucial. They state that "execution of the requisite behavior thus depends on motivational orientation as well as cognitive expectation regarding the possible completion of successful performance" (p.84).

As these results are rather confusing, especially with regard to locus of control and the role of intrinsic/extrinsic motivation, it is probably advisable to return to a consideration of Bandura's concept of the motivational process.

Bandura (1976a) maintains that motivation is primarily concerned with the activation and maintenance of self-reinforcement behaviour. Of the two cognitively based sources of motivation he mentions, one operates through the intervening influence of goal-setting and self-evaluative reactions: by making self-reward conditional upon attaining certain standards of performance, individuals create self-inducements to persist in their efforts until they meet these self-prescribed standards. The second source develops from this first source of self-motivation: once individuals have attained a certain standard of behaviour they are "often no longer satisfied with it and make further self-reward contingent on higher attainments" (Bandura, 1976a, p.193).

#### Treatment strategies

The reconceptualisation of human learning and motivation in terms of cognitive processes - including

beliefs, thoughts and emotions - as outlined here and the increasing emphasis on self-regulatory processes has had major implications for therapeutic procedures. Clinical researchers have indicated the role of various self-reinforcement patterns in the development of pathologies.

Psychopaths have been said to be characterised by extremely low criteria for positive self-reinforcement while relatively low criteria for negative self-reinforcement is said to characterise depressives (Marston, 1964; Taylor & Marshall, 1977). Bandura and Kupers (1964) and Mischel and Liebert (1966) have suggested that a large portion of clients seeking therapy experience self-generated aversive stimulation (eg. guilt) and self-imposed denial of positive self-reinforcers, arising from an exceedingly high standard for self-reinforcement.

With reference to treatment strategies, Drabman (1973) has shown that institutionalised children classified as having severe behavioural problems can successfully participate in the self-administration of their own token reinforcement programmes. To a limited extent, Turkewitz, O'Leary and Ironsmith (1975) and Perry and Busey (1977) have indicated support for this study. The results of their studies, utilising children having severe behavioural problems in academic situations, are similar to those of Drabman's (1973) study.

Bellack, Glanz and Simon (in press), Mahoney (1974) and Rozensky and Bellack (1976) have demonstrated the superior

effects of self-reinforcement weight control strategies relative to external reinforcement programmes with adults. These studies have also indicated the importance of locus of control orientation and motivation in the self-reinforcement process, as those adults who preferred and emphasised self-control lost substantially more weight in the self-, as compared to the external, reinforcement programmes. In another weight control study, Bandura and Simon (1977) found that intentionality, that is, goal-directed behaviour, had a positive influential effect on levels of self-motivation and behaviour change in the programme.

With regard to Kanfer's feedback model of self-regulation, Barling (1980a, 1980b) has demonstrated, in support of Kirschenbaum and Karoly (1977), that the setting of performance standards is more influential in self-regulation than is self-monitoring. Nelson and Birkimer (1978) have shown that self-reinforcement in combination with self-instruction, is more effective in the modification of impulsive behaviour than is self-instruction alone. These studies, in conjunction with Bandura and Perloff's (1967) study, indicate that self-instruction, self-evaluation and self-response processes, either alone or in concert, are essential in self-regulation and self-control of behaviour. Moreover, they form important strategy variables in treatment regimens.

Larson (1976), conceptualising the paranoid personality as characterised by an over-dependence upon environmental

reinforcers, found that, with self-reinforcement training, his client was able to gain some independence from the environment and thereby extinguish previous excessive demand behaviours. In a similar manner, McCullough, Huntsinger and May (1977) successfully treated an aggressive male. In addition, Conway (1977) and Dubren (1977) have demonstrated the validity of such self-reinforcement training programmes as therapeutic techniques in the extinction of smoking behaviour.

Although these studies would seem to indicate that self-regulation and self-reinforcement strategies have a high level of therapeutic efficacy, some researchers have expressed reservations. Kirsch (1978), finding that criterion standard setting and appropriate performance had a substantial influence on self-directed behaviour change, has questioned the need to include tangible self-rewards in the self-regulatory process as he found that the magnitude of influence which could be directly attributed to the self-reward was small.

Karoly (1977) has questioned the therapeutic effectiveness of self-reinforcement processes in relation to children, as most of the treatment studies have involved adults. Moreover, as voluntary delay of gratification is an important part of self-control skill, and as this is age specific, Klein (1978) has expressed doubt as to the relevance of such treatment regimens to young children. Mischel (1973) has suggested that making delayed reward salient upon appropriate behaviour

enhances frustration and could lead to decreased delay of gratification behaviour with young children.

However, Miller and Karniol (1976) have stated that as both these reservations refer to voluntary delay of gratification, they may be more correctly construed as the ability to resist temptation. Hence, under conditions of externally imposed delay, directing attention to the delayed reward - directly or symbolically - should facilitate the time of delay and point to the value of 'waiting'. This indicates that ability to delay gratification and the type of delay situation are functionally related variables, which influence the self-regulatory process. Moore's (1977) specification of age and developmental processes, in this connection, indicate that Miller and Karniol's (1976) injunctions concerning delay of gratification may only apply to young children.

In conclusion, Barling and Patz's (1980) and Morris and Messer's (1978) statements that, regardless of context, children's attributional orientation should be carefully matched with treatment for maximum treatment effectiveness, draw together all the relevant strands of influence involved in the self-regulatory process, indicating that a multi-dimensional treatment programme is the most viable option - a position that would seem to be most in keeping with social learning theory as presented here.

The present study

Reviewing the literature on self-reinforcement processes within the self-regulatory framework, indicates a central problematic area for research, namely, the relative efficacy of locus of reinforcement (self- versus external). That cognitive processes are important for an adequate explanation of human functioning seems self-evident. However, comparative studies of these two reinforcement styles are often contradictory (Martin, 1979, 1980). That this occurs in spite of the social learning postulation that self-reinforcement should be more effective than external reinforcement (Bandura, 1976b) has resulted in the view that a comparison of these two styles necessitates an examination of variables extending beyond the administration of the reward (Barling & Patz, 1980; Morris & Messer, 1978).

The possible role of some of these variables has been alluded to. Specifically, age has been shown to be directly related to the ability to self-reinforce contingently (Barling & Patz, 1980; Masters & Mokros, 1974; Moore, 1977; Winston, Torney & Labbee, 1978); locus of control orientation has been demonstrated as being fundamental to the ability to benefit from self- or external reinforcement programs (Barling & Fincham, in press; Barling & Patz, 1980; Bellack, Glanz & Simon, in press; Morris & Messer, 1978; Rozensky & Bellack, 1976); task orientation and task specificity have been related to motivation and performance on self-reinforcement tasks (Barling, 1980a,

1980b; Dorsey, Kanfer & Duerfeldt, 1971; Marston, 1964; Stouwie, Hetherington & Parke, 1970) as well as previous experience of the task in question; intrinsic reward value has been shown as influencing both task orientation and motivation (Karan, 1975; Liebert & Ora, 1968); and finally, the presence of the reward in the testing situation has been shown to both inhibit and increase different aspects of self-reward behaviour (Miller & Karniol, 1975; Moore, 1977).

Several authors have reviewed and discussed self-control and self-regulatory procedures in children (see Karoly, 1977; O'Leary & O'Leary, 1977). Recent research, however, has concentrated on the classroom (Rosenbaum & Drabman, 1979). This can be seen as arising from the view that

establishing effective self- rather than externally controlled ... programs in schools would enable children to control their own academic and social behavior, while enabling teachers to devote more time to teaching.

(Rosenbaum & Drabman, 1979, p. 467)

A striking feature of all these reviews, however, is the lack of research dealing with environmental influences, the importance of which is stressed in the social learning paradigm (Bandura, 1976b, 1977, 1981). This is even more surprising when one considers that some theorists (Mischel, 1968, 1973; Morris, 1979) have claimed that "at times the person variables exert powerful effects on the individual's behaviour, and at other times the situation is the dominant influence"

(Morris, 1979, p.II). This postulation involves Mischel's distinction between 'strong' and 'weak' situations: 'strong' situations are held to dominate behaviour by minimising the influence of personal variables - such as competency, perception and interpretation, expectancies and values - and self-involvement in the situation. In contrast, 'weak' situations are characterised by ambiguity, unclear expectancies and numerous alternative responses.

Interest in the influence of environments, outside of the positions indicated here, has recently become a growing field of inquiry, involving research of both ecological and psycho-social perspectives (Insel & Moos, 1974). These researchers view the social environment as being made up of people and their interactions with one another, thereby creating a 'climate' or 'atmosphere' specific to that environment (Moos, 1974a, 1974b, 1978; Moos & Trickett, 1974) which then has a determining effect on behaviour.

The basis for this conceptualisation has arisen from dissatisfaction with personality-trait theories (Endler, 1973; Mischel, 1968) and the inability of these theories to adequately account for human functioning. The result of this dissatisfaction is the person-environment theory of 'best-fit' which contends that by matching people and environments on the same psychological dimensions, an explanation and understanding of behaviour across individuals and situations is derived (Endler, 1973; Endler & Magnusson, 1976; Harpin & Sandler,

1979, Pervin, 1968).

Environments, like individuals, are thus said to have 'personalities' which can then be categorised, for example, warm and supportive or cold and punitive. The perceptions of these categories that the individual possesses influence his/her perception of personal capability and effectiveness in that environment which then has a direct influence on behaviour (Moos, 1974b; Solomon & Oberlander, 1974).

Research into the influence of social climates in various situations has proliferated as a result of this conceptualisation (Insel & Moos, 1974; Moos, 1978; Wolk, 1976), most of which has centred around social climates in schools. This concern with educational settings is similar to that of those researchers interested in self-control (self-regulatory) classroom behaviour. It arises from the necessities of teachers who are continually being pressurised to foster the social and emotional development of scholars in addition to their traditional role of equipping scholars with basic academic skills (Finlayson, 1973; Withall, 1949, 1951).

Recent studies have examined the social climate of school classrooms in relation to a number of issues, the most important of these being: (a) pupil's self-concept and intergroup behaviour (Barclay & Wu, 1980; Hertz-Lazarowitz & Sharan, 1979; Hunter & Meyers, 1979; Morrison, 1979; Nielsen & Moos, 1978; Pervin, 1968; Ruedi & West, 1973; Serow & Solomon, 1979) and (b) pupil's locus

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of control orientation, locus of reinforcement and subsequent academic performance (Arlin, 1975; Barclay & Wu, 1980; Harpin & Sandler, 1979; Henderson & Hennig, 1979; Hetz-Lazarowitz & Sharan, 1979; Hunter & Meyers, 1972; Parent, Forward, Canter & Mohling, 1975; Solomon & Oberlander, 1974; Waller & Gaa, 1974).

This research has indicated that children who are anxious, conforming and externally oriented, achieve higher academic performance in classrooms they perceive to be highly structured and least demanding in terms of participation. In contrast, scholars who are not anxious, independent and internally oriented do better in classrooms they perceive as being relatively unstructured and more demanding in terms of participation. Moreover, this research has demonstrated that academic achievement is multidimensional, being influenced by self, peer and teacher expectations, abilities and behavioural consequences. This conception includes such factors as age, sex, locus of control and socio-economic and cultural backgrounds.

With reference to reinforcement strategies, however, results from studies are often conflicting. Some researchers (Cravens & Worschel, 1977; Michaels, 1977) have shown that locus of reinforcement and locus of control have an important interactive effect with classroom reward structure, such that internals perform better under self-reinforcement conditions in self-controlled reward situations.

Hamilton and Gordon (1978) have indicated that this

may not reflect the true situation. They found that subjects who had been rewarded in the classroom situation, regardless of locus of control orientation, did significantly worse on academic tasks in the experimental situation. This result can, however, be attributed to a number of reasons including the notion that scholars with a history of classroom reinforcement would expect both reward and feedback on the task and would, therefore, become anxious when faced with the removal of this reward-feedback structure, which would effect their performance.

The close conformity between research on self-reinforcement and self-regulatory processes within social learning theory and the results of research in social climates of the classroom, would seem to indicate that a combination of these two positions should result in a more adequate explanation of the factors influencing self-regulatory behaviour. Therefore, the number of variables included in this investigation of self-regulation, relative to previous research, was increased. As such, variables can be divided into five general categories: age or standard (grade), locus of control, locus of reinforcement, perceived classroom environment and academic performance.

This general categorisation, in a global and simplified way, seems to reflect the three interactive determinants of human functioning that form the basis of social learning theory (Bandura, 1976; Morris, 1979),

namely, the environmental influence (i.e. perceived classroom environment), behaviour (i.e. academic performance) and intrapersonal influences (i.e. age/standard and locus of control).

### METHOD

#### Subjects

Forty-eight standard three (mean age = 10.06 years) and forty-eight standard four (mean age = 11.10 years), white scholars served as subjects. Both standards contained 30 males and 18 females. When subjects were divided into external (ER) and self-reinforcement (SR) groups, the number of male and female subjects in each group was kept constant, as far as was possible, even though previous studies have not unequivocally indicated sex differences.

All subjects were drawn from the same government primary school in Kensington, Johannesburg. Subjects are thus presumed to have come from a similar socio-economic background. It must be noted, however, that subjects were from diverse cultural backgrounds, including both English and Afrikaans speaking South African groups, Portugese, Italian, Chinese and Greek cultures. Although there is some indication that culture does influence locus of control orientation (Barling & Fincham, 1973) and perceived classroom environment (Barclay & Wu, 1980),

this is presumed to be inoperative in the present study, as all subjects had been at the school since grade I. Their perceptions of classroom environment and locus of control in the academic - scholastic situation would thus be more closely related to the general school climate than to their different cultural backgrounds.

Two white, female post-graduate psychology students served as experimenters throughout the study.

#### Questionnaires

Three sets of test materials were employed: the Intellectual Achievement Responsibility Questionnaire (IAR); the Classroom Environment Scale (CES) and the Scholastic Achievement Test in Arithmetic (SATA). In addition, reinforcers in the form of stars which were exchanged for 'prizes' (rewards) ranging in value from 10 to 200 cents were utilised.

#### The Intellectual Achievement Responsibility Questionnaire

The IAR was devised by Crandall, Katkovsky and Crandall (1965) in order to classify children as internally or externally oriented in the academic situation and is based on Rotter's pioneering work with locus of control (Lefcourt, 1976; Phares, 1976).

This paper-and-pencil test consists of 34 items in a forced-choice format and caters for children from the third grade and above.

The scale was chosen for this study as it assesses specific locus of control expectancies regarding academic performance. Moreover, its reliability and validity have been well documented (Barling & Fincham, 1978).

#### The Classroom Environment Scale

The CES was devised by Moos (1974b) and Moos and Trickett (1974) for use in assessing the social climates of classrooms, based on the assumption that this climate exerts a direct influence on behaviour.

The short form of this scale (CES - S form) consists of 36 forced-choice items in a true-false format. This scale assesses the perceived classroom climate and measures nine categories of that climate: involvement, affiliation, teacher support, task orientation, competition, order and organisation, rule clarity, teacher control and innovation. These categories are then grouped into four dimensions: system maintenance dimensions, relationship dimensions, personal development dimensions and system change dimensions.

The scale was chosen for this study as it had been shown to reliably measure perceived classroom environment (Trickett & Moos, 1973, 1974; Trickett & Quinlan, 1979). Moreover, Keyser and Barling (1981) have pointed to the applicability of this scale to white scholars in the South African situation.

#### The Scholastic Achievement Test in Arithmetic

The SATA which was used to assess the arithmetic

performance of each subject is a standard-appropriate, paper-and-pencil test specifically devised for South African scholars.

The test consists of 60 standardised items which fall into three equal length subtests. Each test has been compiled so as to test a different aspect of arithmetic ability. The first deals with the four fundamental arithmetic operations in number format, the second deals with the pupil's comprehension of arithmetic matter, and the third subtest assesses the pupil's ability to cope with standard-appropriate problems in a verbal format. Measures obtained on each subtest were grouped to obtain the dependent measures - task persistence (number of problems attempted) and task accuracy (number of problems correct). The reliability and validity of this test has been well documented (Barling, 1980a, 1980b).

All these tests, including both forms of the two standard-appropriate SATA's for standards three and four, are reproduced in full in the appendix.

#### Procedure

The IAR was initially administered to all members of the standard three and four classes in a group test situation (193 pupils were tested). On the basis of the obtained locus of control scores, 48 subjects from each standard were chosen to participate in the study. These children were selected and divided into

high internal ( $M = 28.97$ ,  $SD = 1.62$ ) and high external ( $M = 20.04$ ,  $SD = 2.79$ ) locus of control groups on the basis of their scores. T-tests showed the two groups to be significantly different ( $t(94) = 19.20$ ,  $p < .001$ ).

Following this grouping, subjects were randomly assigned to external (ER) or self-reinforcement (SR) groups. Subjects were thus assigned to one of four experimental groups: (i) internal locus of control/self-reinforcement; (ii) internal locus of control/external reinforcement; (iii) external locus of control/self-reinforcement; and (iv) external locus of control/external reinforcement. Inclusion of standard three or four membership in the experimental grouping resulted in a  $2 \times 2 \times 2$  experimental design - standard  $\times$  locus of control  $\times$  locus of reinforcement.

The experimental phase commenced with each subject being individually brought to one of two testing rooms. Subjects were then seated at a table across from the tester and a short conversation, to put the subject at ease, followed. Subjects then received the following instructions, based on those used by Barling and Patz (1980):

This is an arithmetic test with a difference. When people do a job of work, they are paid for what they do. You are going to earn stars for doing problems which you can then use to buy prizes. In order to earn stars only right answers will count. Do you understand? Your job is to answer as many problems as you want to. Each time you get an answer correct I will show you this red card, it means that you have got the answer right. (Repeat)

At this stage, the groups received different experimental manipulations. Subjects in the self-reinforcement condition, regardless of locus of control orientation or standard, received the following instructions:

You may then take, if you want it and feel you deserve it, one star. (Repeat). When you have finished all the problems you will be able to change the stars for prizes. Let us look at the prizes and I will show you what I mean ...

Subjects in both external reinforcement condition were told:

You will then receive one star for each correct answer. (Repeat). When you have finished, you will be able to change the stars for prizes. Let us take a look at the prizes and I will show you what I mean ...

All subjects were then shown the prizes which had been arranged on a table along a wall in each testing room. The prizes ranged in value from a pencil sharpener worth 5 stars to a pencil case worth 30 stars. Although Moore (1977) has referred to the confounding effects of concrete rewards in the self-reinforcement testing situation, it was felt that having the prizes in full view of the subjects served an important motivational function, as it would enhance the value of the prizes and thus, perhaps, increase task orientation and task persistence (Miller & Karniol, 1976).

In addition, prizes were selected as rewards on the

basis of their relationship to the academic situation. This was done in an attempt to increase their incentive value in terms of salience to the academic task in the testing situation.

Subjects were given stars which they then exchanged for prizes in order to more closely simulate the naturalistic setting. In academic situations it often occurs that children receive immediate feedback regarding their behaviour and sometimes their performance (Bandura, 1976b). Subjects were thus able to monitor their performance against a standard set for them and to modify that performance in terms of immediate feedback as to the adequacy of that performance (Barling & Patz, 1980).

Previous locus of reinforcement comparative studies have yoked subjects together in terms of the stringency of the performance standards exhibited by the self-reinforcement subjects' responses, as well as age and locus of control orientation (Barling & Patz, 1980). However, in the present study, subjects were not yoked together in this way in view of the fact that the subjects responses were to be further analysed in terms of CES perception. It was thus assumed that a more accurate representation of variables influencing the self-reinforcement process prior to the self-reinforcement response would be afforded if all subjects were to receive immediate and equal feedback responses for equal performance behaviour.

Each subject was given ten minutes to complete the three subtests on the SATA. Four sets of scores for each dependent measure were obtained from each subject's responses, namely, task accuracy and task persistence on each SATA subtest as well as total accuracy and persistence scores across subtests. As Pearson product-moment correlations ( $r(96)$ ) between the three subtests revealed very high correlations for task persistence (in all cases  $p < .001$ ) and task accuracy (in all cases  $p < .001$ ), only total task accuracy and task persistence scores were used in the analyses.

Following the experimental phase, all subjects were called together and the CES was administered to each subject in a group testing situation. As some of the items on the CES refer to the scholar's perception of the teacher, it was considered to be important to administer this test as the final phase of the study. It was felt that scholars would be more likely to reflect an accurate perception of their respective classrooms as (i) they had built some degree of relationship with the tester and would therefore, presumably, have more confidence in the tester's assurance of confidentiality, and (ii) they were aware that it was the end of their involvement in the testing sequence and would therefore, presumably, feel more relaxed about answering the CES items.

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### RESULTS

Originally it was thought that in the 2 x 2 x 2 (standard x locus of control x locus of reinforcement) experimental design, differences between standard three and four subjects would be reflected by age. However, calculation of the mean and standard deviation for age ( $M = 11.53$ ,  $SD = .85$ ) seemed to suggest that differences between the two standards might not be significant. Pearson product-moment correlations revealed no significant interactions for age/task persistence ( $r(96) = .23$ ,  $p > .01$ ) or for age/task accuracy ( $r(96) = .07$ ,  $p > .10$ ).

As a previous study (Keyser & Barling, 1981) had demonstrated the validity of the CES with white South African scholars, a separate analysis of each item on the CES - S. form was not performed. Rather, in accord with Moos' (Moos, 1974b; Moos & Trickett, 1974) conceptualisation, the 36 items were scored according to the nine CES subscales and a factor analysis was performed on these scores (Table I).

A principle component factor analysis with varimax rotation (Kerlinger, 1973) produced a single factor with an eigenvalue greater than 1.00, explaining 42.4 percent of the variance. This factor reflected four of the nine subscales and three of the dimensions of classroom climate perception - affiliation (relationship dimension); rule clarity and teacher control (system maintenance dimension) and competition (personal development dimension) - in descending order of

importance.

TABLE I

Principal component factor analysis for the  
CES showing the relative contributions of each  
subscale

| <u>CES subscale</u>           | <u>Factor I</u> | <u>Communality</u> |
|-------------------------------|-----------------|--------------------|
| Involvement                   | -.01            | .46                |
| Affiliation                   | .69             | .91                |
| Teacher support               | .22             | .15                |
| Task orientation              | .27             | .14                |
| Competition                   | .44             | .33                |
| Order and Organization        | -.13            | .50                |
| Rule clarity                  | .67             | .65                |
| Teacher control               | .48             | .38                |
| Innovation                    | .05             | .02                |
| <u>Eigenvalue</u>             | 1.51            |                    |
| <u>Percentage of variance</u> | 42.4 %          |                    |

In view of these results, the CES was used as a global measure for assessing the moderating influence of the classroom in terms of facilitating or inhibiting the development of involvement or participation in the classroom situation (Moos, 1974b; Nielsen & Moos, 1978). Using the CES in this way has been related to locus of control attribution, anxiety and consequent academic (scholastic) performance (Arlin, 1975; Hamilton & Gordon, 1978). Thus scores across all dimensions on the CES

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were summed and subjects were then grouped according to their total perception of the classroom climate (environment) as inhibitive ( $\bar{M} = 20.88$ ,  $SD = 2.47$ ) or facilitative ( $\bar{M} = 26.75$ ,  $SD = 2.26$ ) of pupil involvement and participation. T-tests showed that these groups were significantly different ( $t(94) = 12.14$ ,  $p < .001$ ).

Since a high correlation was yielded between the two dependent variables (task persistence/task accuracy:  $r(96) = .58$ ,  $p < .001$ ), the use of a multivariate analysis of variance was necessitated (Barling, 1982; Barling & Patz, 1980). This analysis was used to determine the significance of the interactions between the variables. A  $2 \times 2 \times 2$  (CES x LOC x reinforcement) MANOVA using Wilks' criterion for exact F was computed. This analysis revealed no significant interactions with task persistence. However, a significant main effect for reinforcement ( $F(3,86) = 4.04$ ,  $p < .01$ ) and a significant reinforcement x LOC interaction ( $F(3,86) = 3.03$ ,  $p < .05$ ) was obtained with task accuracy.

To determine the relative contributions of the two dependent variables to the significant multivariate reinforcement x LOC interaction, two separate  $2 \times 2 \times 2$  (CES x LOC x reinforcement) ANOVAs were computed for task accuracy and task persistence (Barling, 1982; Barling & Patz, 1980). The task persistence analysis revealed a significant main effect for LOC ( $F(1,95) = 4.47$ ,  $p < .05$ ) only. However, the task accuracy analysis revealed a significant LOC x reinforcement interaction

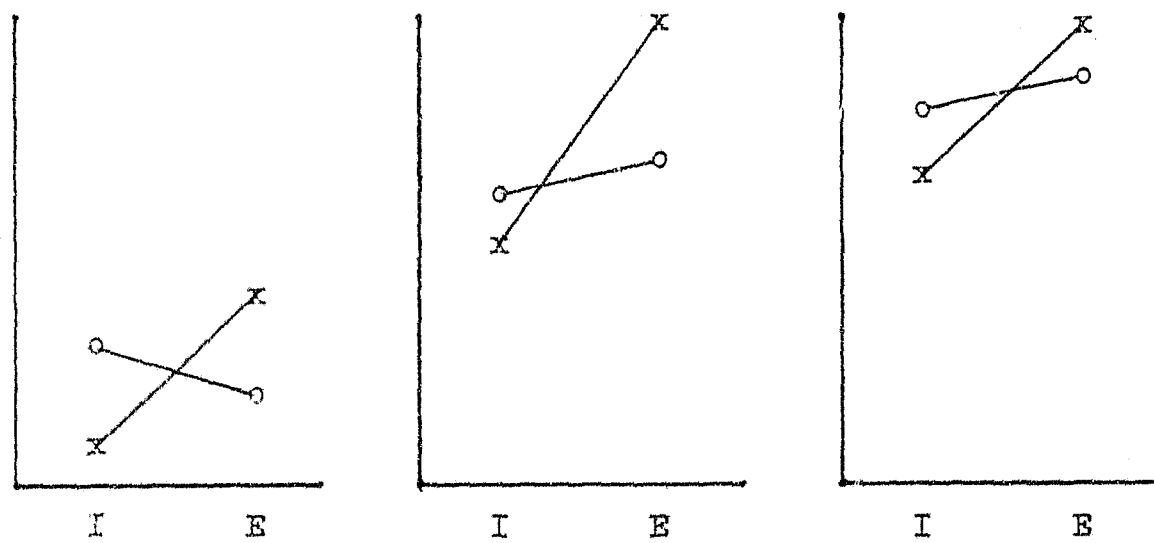
( $F(1,95) = 6.54, p < .05$ ).

In order to further examine the LOC x reinforcement relationship, univariate ANOVAs were computed (Barling, 1980a, 1980b) for each dependent measure. Cochran's C statistic was first generated to assess whether the homogeneity of variance assumption was satisfied in each case. Task persistence revealed no significant LOC x reinforcement group differences ( $F(3,95) = 1.88, p > .10$ ). A non-parametric distribution-free analysis of variance (Wilson, 1956) was compiled for task accuracy as this variable did not satisfy the test for homogeneity of variance ( $C = .35, p > .10$ ). This analysis revealed a significant LOC x reinforcement group difference ( $\chi^2(1) = 6.27, p < .02$ ).

T-tests were then computed to assess the significance of the differences between the groups. This analysis revealed that, with regard to task accuracy, self-reinforcement was more effective than external reinforcement when combined with appropriate LOC attribution (i.e. internal LOC): ( $t(46) = 2.32, p < .03$ ) for self-reinforcement, while external reinforcement was more effective than self-reinforcement when combined with external LOC attribution: ( $t(46) = 2.06, p < .05$ ) for external reinforcement. These results are depicted graphically in Figure I.

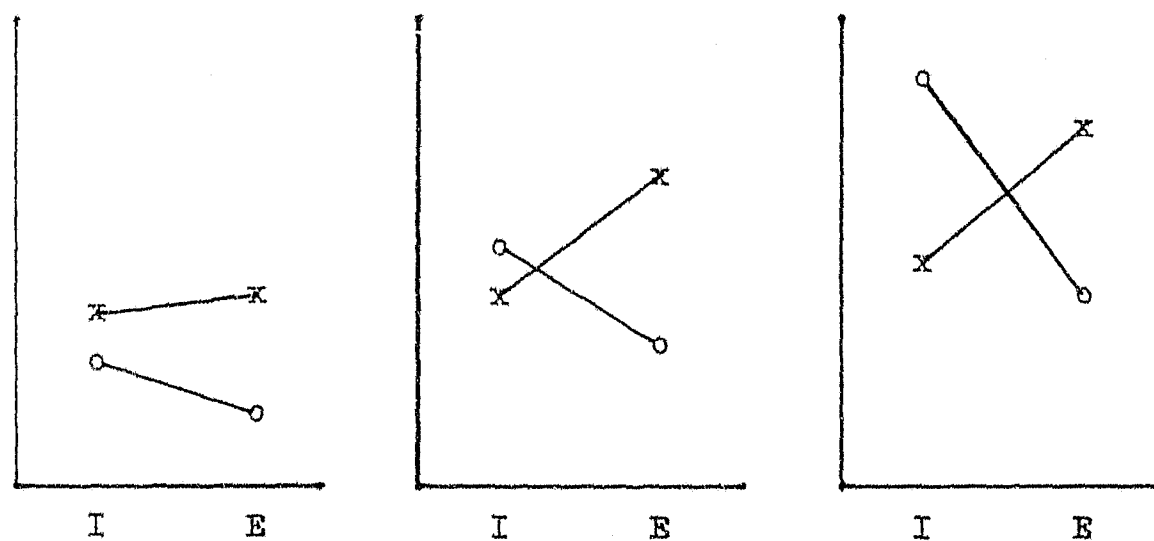
FIGURE I

Interaction of reinforcement style and LOC on  
univariate dependent measures



TASK PERSISTENCE

I - Internal locus of control      o - self-reinforcement  
E - External locus of control      x - external reinforcement

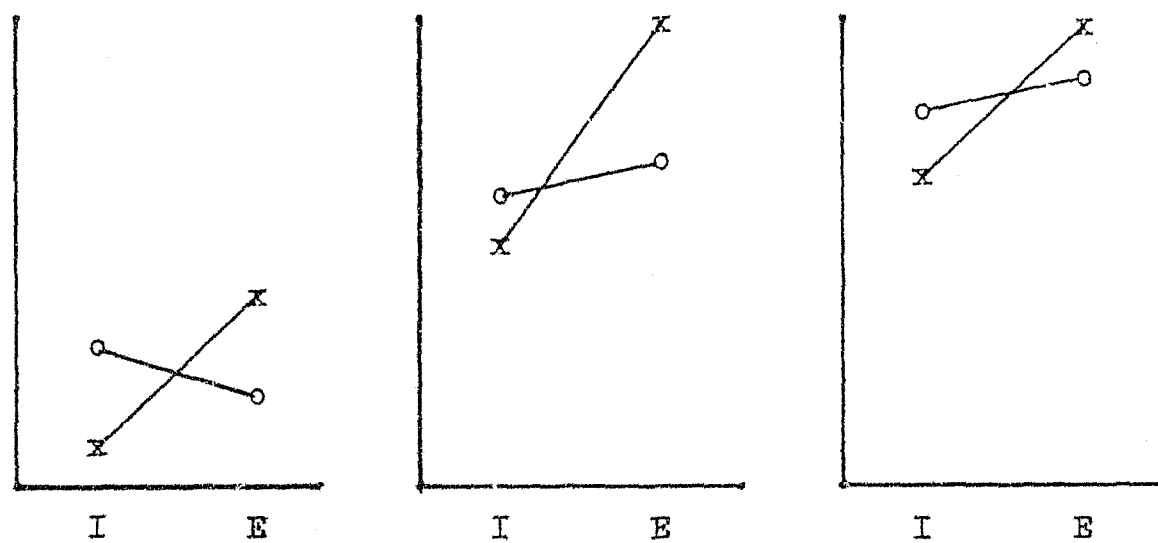


TASK ACCURACY

I - Internal locus of control      o - self-reinforcement  
E - External locus of control      x - external reinforcement

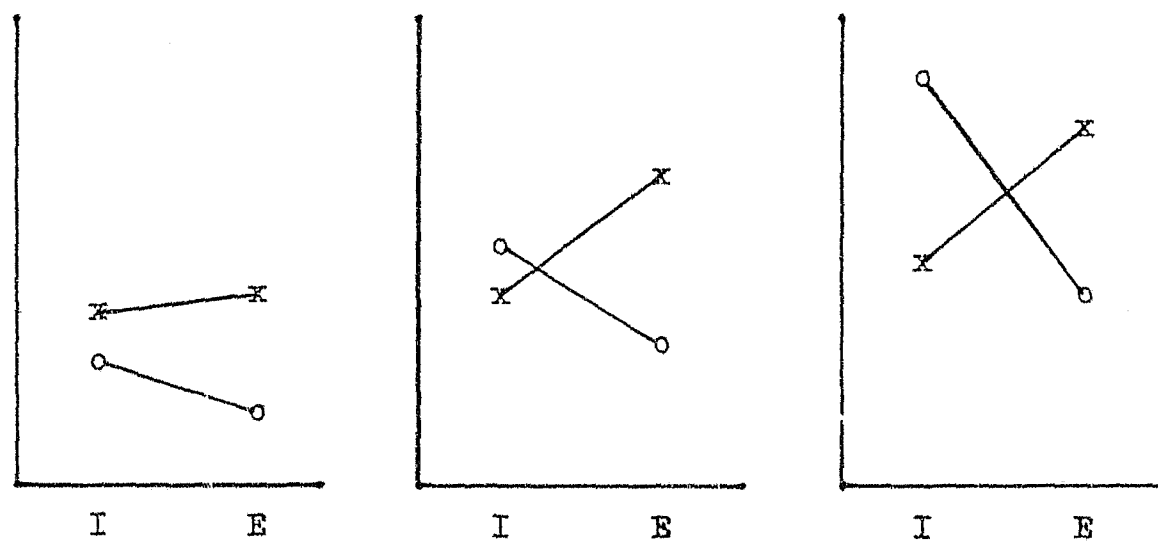
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E - External locus of control      x - external reinforcement



TASK ACCURACY

I - Internal locus of control      o - self-reinforcement  
E - External locus of control      x - external reinforcement

### DISCUSSION

The results of the present study demonstrate that differential effects may accrue to self- and external reinforcement (reinforcement style) if specific locus of control attributions are taken into account. Specifically, self-reinforcement was more effective for those subjects with an internal locus of control orientation while external reinforcement was more effective with the externally oriented subjects. However, this finding did not apply to all measures of the effects of this interaction on performance. Rather, the results were related specifically to task accuracy and no such interaction effects were obtained for task persistence measures. Therefore, the present study may be said to have demonstrated that combining reinforcement style with locus of control orientation had a positive, enhancing effect on subsequent performance skill but did not influence performance motivation.

In general, the finding that matching subjects' locus of control attributions with appropriate reinforcement enhances performance is in accord with those studies reviewed here (Barling, 1982; Barling & Patz, 1980; Bellack, Glanz & Simon, in press; Morris & Messer, 1978; Rozensky & Bellack, 1976). However, that this finding related to task accuracy and not task persistence conflicts with previous studies (Barling, 1980a, 1980b; Barling & Patz, 1980) and with the social learning theory

conceptualisation that the cognitive expectation of reward enhances response motivation (Bandura, 1976b). This finding is especially noteworthy in that it would seem to be in some contradiction to Bandura's (1976b) contention that self- relative to external reinforcement has a motivational rather than an informative function. The greater motivational function thus attributed to self-reinforcement is postulated as resulting from the criterion standards for performance (performance information) having been acquired and determined prior to self-response acquisition and therefore being already present in the self-reinforcement process (Bandura, 1976b, 1981).

In terms of the present study's results conflicting with this contention, it must be noted that subjects were given immediate contingent feedback regarding the accuracy of their performance responses. Providing subjects with such corrective feedback would probably serve to increase the number of correct responses made, thereby controlling for and masking any increases in the number of responses made. Thus, measures of task accuracy would reflect this increase relative to the total number of responses such that task persistence would not seem to have been influenced.

An alternative explanation for this phenomenon has provided in a recent study (Schunk, 1981) which assessed achievement behaviour from a combination of self-efficacy and attribution theories. Within the social learning

perspective, achievement behaviour has been analysed in terms of (a) levels of aspiration - self-determined goals and (b) outcome expectations - the belief that a certain behaviour will lead to specific outcomes (Phares, 1976). The importance of these positions to self-efficacy theory and attribution theory is readily apparent. Briefly, the first of these is concerned with the person's judgements as to the capability of his/her performance (Bandura, 1976a) and views behavioural functioning as being influenced by the individual's "choice of activities, effort expenditure, and persistence in the face of difficulties" (Schunk, 1981, p.93).

Attribution theory on the other hand, is concerned with the person's belief that performance outcome is related to personal effort (Weiner, 1972). As such, believing that increased effort produces success results in increased persistence and levels of performance.

Based on a combination of these two positions, Schunk (1981) hypothesised that effort attribution would effect self-efficacy and the development of skills. He found that when children were provided with "valid information concerning their arithmetic competence, any effects of persuasive effort attribution may have been overridden" (Schunk, 1981, pp.102-103). The results of the present study are in accord with and seem to offer some support for Schunk's (1981) finding. This is especially important in the light of Schunk's claim that

treatment differences exert their effects directly on changes in skills and indirectly through changes in self-efficacy

(Schunk, 1981, p.102)

Thus, it seems plausible to suggest that in the present study matching reinforcement style with subjects' locus of control attribution enhanced performance directly and indirectly enhanced performance attribution. That is, following increments in skill, internal locus of control attribution would be enhanced which would positively influence task persistence and performance at a later stage. More importantly, these results would seem to indicate the need for a combined attribution training programme in the schools.

In their review of self-control training programmes in the classroom, Rosenbaum and Drabman (1979) have pointed to the need for such programmes. The claim being that these programmes leave teachers more time to devote to actual teaching strategies (Finlayson, 1973; O'Leary & O'Leary, 1976; Withall, 1949, 1951) and effectively allow children to develop their own self-control (self-regulatory) procedures for the evaluation and maintenance of academic skills and performance. More importantly, these researchers have pointed out that a history of previous inconsistent reinforcement "might impair students' subsequent abilities to apply self-determined contingencies effectively" (Rosenbaum & Drabman, 1979, pp.471 - 472).

As scholars in the present study had been exposed to a variety of teachers and classroom environments,

they would most probably also have been exposed to a variety of externally determined stringency and reinforcement standards. As such, both their abilities to self-reinforce contingently and to develop a determining internal locus of control orientation would be adversely moderated by the effects of these inconsistent modeling standards and situational structures.

Research has indicated that the development of locus of control beliefs is dependent on the structure of the specific situation (Arlin, 1975; Michaels, 1977; Morrison, 1979; Wolk, 1976) and the development of internal - external locus of control beliefs is largely influenced by expectations of the scholar's performance from their teachers, parents and peers (Schlechty, 1974). Added to this is the fact that teachers structure learning activities in specific ways. These organisational activities then influence the interactional patterns among scholars in a definite and distinctive fashion and consequently affect the cognitive and emotional development of each scholar (Bossert, 1979; Henderson & Hennig, 1979). Organisational activities also relate to the reward structures within the classroom. According to Michaels (1977) "the complementary strengths and weaknesses of individual and group reward structures may effectively strengthen both task performance and group process variables" (p.96). This is important, as in most classroom situations teachers will attend selectively to an individual scholar's performance.

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However, as classes in this study were rather large (an average of 38 pupils per class), this selective attention would not have been given to each scholar. Thus, the majority of scholars would presumably have been exposed to more general attention and group reward structures.

Some support for the contention that subjects in the present study were exposed to classroom reward structures which focused on group rather than individual processes is indicated by the factor analysis of the CES scores. Contrary to a number of studies which have employed this scale (Henderson & Hennig, 1979; Trickett & Moos, 1974; Trickett & Quinlan, 1979), the present analysis revealed that affiliation and not competition was the central most important perception of the classroom environment. This would seem to suggest that in these classrooms, peer interactions and group involvement would be more influential than individual, non-collaborative processes.

This suggestion can be seen to enhance understanding of the locus of control phenomenon in the present study, namely, that internal - external locus of control attribution, by itself, did not significantly interact with any of the dependent measures. When the results of the CES factor analysis are viewed in conjunction with the lack of effects accruing to the locus of control variable alone, an explanation for task performance in the testing situation can be posited.

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This explanation is seen as being in line with social learning theory formulations as it involves the notion of locus of control orientations having an adaptive function, that function being situation specific.

Social learning theory approaches have postulated that

where the situation allows it,  
belief in internal control may be  
consistent with an attempt and  
success at personal effectiveness  
... (while) under conditions of  
strong environmental control,  
believing in personal locus of  
control, and exerting oneself as  
a function of this belief, may  
not only be unrealistic, but  
contraadaptive

(Wolk, 1976, p.421)

In addition, the adaptive function of locus of control orientations is underlined by the realisation that misjudgements in either direction (inaccurate praise or criticism) can have negative consequences for the individual (Schunk, 1981). Thus, information concerning the validity of performance should increase accurate appraisal, thereby directly enhancing appropriate locus of control attribution and indirectly influencing adaptive behaviour in the situation.

Therefore, in terms of the present study, subjects increased task accuracy responses can be seen as the result of the valid information concerning their performance. However, as the testing situation was structured differently from that of the classroom (individual reward and immediate feedback versus group reward) any enhancing effects that might have been

accrued from this increased skill efficiency would be delayed. More importantly, subjects being more accustomed to group reward structures would perceive a contextual difference in the testing situation. Therefore, they might possibly perceive the immediate feedback in terms of academic skill only and this would have little effect on their response persistence as such.

With regard to the classroom structure, it would seem that the present CES results conflict with previous studies (Arlin, 1975; Hamilton & Gordon, 1978) as global perceptions of the classroom environment (inhibitive versus facilitative) were shown not to interact with locus of control attribution or reinforcement style. However, this may have been due to the relatively small number of subjects ( $n = 96$ ) and to the social climate of the school as a whole. As scholars at the school were exposed to a number of different subject teachers, this can be seen to have influenced their perceptions of the classroom structure in a number of possible ways.

Firstly, not having one teacher for the entire subject curriculum would seem to inhibit the development of a central perception of the classroom environment as inhibitive or facilitative. Secondly, as scholars in different classrooms but the same standard would experience the same teacher for a particular subject (e.g., arithmetic), development of a classroom climate perception would be similar for all these scholars.

Taken together, these differences can be postulated as significantly influencing classroom environment perception in the same manner such that pupil's perceptions would not differ markedly amongst one another within the same standard and subject. As such, a more adequate investigation of this variable would necessitate determining scholar's perceptions of the classroom environment with regard to a specific subject. This specific perception being included in investigation of the effects of a combined reinforcement style/locus of control orientation regimen on task performance with regard to that specific subject.

In this connection, it must be noted that the above explanation might not reflect the whole situation. Rather, teachers coming from a standardised training background would most probably treat the different classes in a similar fashion. Thus, it seems plausible that a scholar's perception of the different subject teachers would be highly correlated and that a more influential variable might be the scholar's perceptions of their interactions with one another. As such, scholars in different standards may be viewed as having more significantly different classroom interaction perceptions, and indicates that a combined age and CES variable would more accurately indicate this difference. Moreover, this difference would possibly have a direct influence on task performance.

For this reason, a supplementary analysis was

constructed to determine the influence of standard (class) membership with reinforcement style and locus of control orientation on subsequent performance<sup>I</sup>. Analysing the data in this way seems to suggest that these variables, in concert, affect scholastic persistence and motivation, but do not affect skill. This would be in accord with Parent et al's (1975) contention that academic performance is "much more a function of the fit between the maturational learning skills represented by the personal control I - E subscale and the external condition of teaching method and discipline" (Parent, Forward, Canter & Mohling, 1975, p.769). Moreover, this can be seen as in keeping with the adaptive function of locus of control attributions. As such, a more adequate investigation of the relationship between age, class membership, locus of control orientation and reinforcement style, and the subsequent effects of this relationship on scholastic performance would seem to be one of an extended nature. That is, the need for a pre-post experimental design is advocated here.

A major problem related to the present study and to the above postulation concerns the question of age. That the age variable did not interact significantly

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<sup>I</sup> A one-way analysis of variance of task accuracy and task persistence measures with the combined standard (class) x LOC x reinforcement variable revealed a significant main effect for the interaction of task persistence with the combined variable ( $F(1,23) = 3.18, p < .001$ ) but did not reveal any such effect for task accuracy ( $F(1,23) = 1.56, p > .10$ )

with any of the other measures was unexpected. However, this can be readily understood when the slight mean age difference between the two standards is taken into account. As such, an investigation of the effects of age differences should involve groups with a mean age difference of at least four to five years or a longitudinal study. The need for research designs of this nature would seem to be indicated and perhaps emphasised by those studies which have shown internal locus of control orientation to be related to development and maturational processes (Hertz-Lazarowitz & Sharan, 1979; Parent, Forward, Canter & Mohling, 1975). As well as those studies which have demonstrated that the ability to self-reinforce contingently is a function of both age and locus of control orientation (Borling & Patz, 1980; Gordon & Bollick, 1979).

In view of the relationship between age and locus of control orientation, the present results may be said to indicate that children in academic situations are able to utilise immediate performance feedback so as to improve their on-task efficiency. However, because this feedback seems somehow to mitigate the effects of performance motivation (Schunk, 1981), because of the contextual differences and because these subjects may not have been old enough to internalise the effects of this increased efficiency directly, they might then depend on external agencies to immediately motivate

their on-task performance. It must be noted, however, that as the measures for task persistence were restricted by the amount of time available for completion of each subtest, the lack of significant effects accruing to this variable may, in part, be attributed to this. As such, a more adequate representation of this variable would probably be obtained by measuring the length of time subjects persisted at a task rather than setting a time limit for them.

A third and severe limitation of the present study is a lack of investigation of the task organisations within the classroom situation and the teachers expectations of each pupil. This latter point is important in view of the social learning theory postulation that teachers expectations of pupils might act as self-fulfilling prophecies (Good & Brophy, 1974). This notion is largely based upon self-efficacy theory (Bandura, 1976a) and holds that the teacher who expects specific behaviour and achievement from a particular pupil will act in a differential manner toward that pupil which consequently has a direct effect on that pupil's self-efficacy beliefs, self-concept, achievement motivation and standard of performance. Thus, "high-expectation students will be led to achieve at high levels, and the achievement of low-expectation students will decline" (Good & Brophy, 1974, p.55).

Finally, it must be noted that using arithmetic

tests only for task performance measures limits the value of any findings accruing to this study. As has been previously stated, self-reinforcement behaviour is task specific (Barling & Patz, 1980; Barling, 1982). In view of this, it must be noted that the locus of control orientation measured by the IAR refers to the academic situation as a whole and not to arithmetic competence alone. Therefore, inclusion of verbal and arithmetic tests might more accurately reflect differences in task persistence. This would seem especially important in view of Barling's (1982) study which revealed that a reinforcement style/locus of control interaction did not significantly affect arithmetic performance but did significantly enhance verbal task motivation. With reference to this last point, Barling (1982) has pointed to the necessity for increasing the skills required to perform a task before attempting to enhance "motivation to improve overall performance" (p.102). The results of the present study would seem to offer some tentative support for this. That is, giving direct feedback enhances task accuracy which is then postulated here to enhance motivation and performance level at a later stage.

The importance of the various issues raised in this discussion to an understanding of the locus of control orientation and reinforcement style interaction effects within the school context is readily apparent. As such, pupils' task performance may be viewed as a

function of the congruence between their self-perceptions and their perceptions of the situation (Wolk, 1976). Thus, self-perception would be significantly influenced by the maturational development of locus of control beliefs and the feedback from teachers regarding the accuracy of scholastic performance. Situation perception, on the other hand, would significantly influence behaviour displayed by the pupils on the basis of this self-perception and would depend on the pupil's perception of the situational constraints.

For these reasons, subjects in the present study are viewed as having developed an internal - external locus of control orientation on the basis of their scholastic performance and the teachers evaluations of this performance. However, this orientation is modified by the classroom structure and task organisation. This moderating effect is postulated as arising from the fact that pupils were and are exposed to a number of different teachers and that possible inconsistencies due to this exposure have resulted in the development of a greater reliance upon peer interactions and group processes. Thus, performance in the classroom would be largely determined by the appropriateness of that performance to the group situation.

With regard to the scholastic and teaching situation, it would seem that teaching children to accurately self-regulate behaviour is a two-fold process. Initially, individual direct feedback is necessary for pupils to

develop the skills required to complete certain problems. With the pupils' internalisation of this task accuracy and skill, it is probable that appropriate internal locus of control attribution would develop. This would then be accompanied by the development of self-standards for performance and accurate self-evaluations. Following this, teachers could then serve as intermittent external reinforcement agencies, as it is presumed that accurate self-evaluation and self-response serve to motivate future behaviour (Bandura, 1976b, 1977), and this accuracy must needs be checked against an external standard in order to maintain and motivate further self-regulatory behaviour (Bandura, 1976a).

Most importantly, the importance of such self-regulatory training programmes pointed to in the various discussions and reviews of self-control training in the schools (Finlayson, 1973; O'Leary & O'Leary, 1977; Rosenbaum & Drabman, 1979; Withall, 1949, 1951), is directly indicated by the statement that "the problems of self-management must be addressed if one is interested in long-term behavior change" (O'Leary & O'Leary, 1977, p.301).

In conclusion, it must be noted that although the results of the present study are somewhat conflicting, they do indicate some support for self-reinforcement in the self-regulatory process. However, it must be stated that these results in no way indicate that self-reinforcement is more effective, generally, than external reinforcement (Bandura, 1976b). Neither do

these results support Barling and Patz's (1980) suggestion that self-reinforcement may be more effective than external reinforcement when variables extending beyond the administration of the reward are taken into account. As such, it is the contention of this author that a "theory which possesses adequate logical consistency and correctly represents empirical data" (Martin, 1979, p.145) of the self-regulatory process involves an in-depth investigation of some of those variables postulated in this discussion. Specifically, that inclusion of both reinforcement styles is necessary for an adequate explanation of the development and maintenance of appropriate self-regulatory behaviour (Bandura, 1981).

In view of this, Barling and Patz's (1980) study which suggests that empirical demonstration of the greater effectiveness of self-reinforcement relative to external reinforcement when individual differences and variables emerging prior to the self-response behaviour are taken into account, is reformulated here as the search for those variables which affect individual perception of efficacy in specific situations and in relation to specific tasks. Thus an adequate explanation would have to involve considerations of sex, age, developmental (maturational) levels, cognitive style, locus of control attribution, environmental (classroom) climate perception, situational constraints and task organisation. Moreover, task behaviour and expectations regarding the

task from both the scholar and the teacher would have to be included. Finally, as the school is not an isolated organisation but part of a wider social community, socio-economic and possible cultural differences would also have to be accounted for.

Inclusion of all these variables in a multi-dimensional, multifactorial theoretical and experimental approach should enhance understanding and explanation of the self-regulatory mechanism within the social learning theory paradigm. Most importantly, by virtue of its wide-ranging nature, this account would probably be more accurate in specifying the conditions governing psychological phenomena and the mechanisms by which probable determining influences produce their effects.

In connection with this it must be noted that it seems apparent to this author that two related lines of research are indicated: Firstly, in line with the design of this study, investigation should centre around which individual pupils benefit most from a combined reinforcement style/locus of control orientation programme in relation to those variables mentioned above, for example, age, task, situation, previous history, teacher expectations, etc. This line of investigation would be, in many respects, an expansion and extension of previous research. Secondly, investigation should focus on the development of the self-regulatory process, centering upon the relative importance of self- and external reinforcement during the acquisition, maintenance

and generalisation of self-regulatory behaviour. It is hoped that by including both self- and external reinforcement in a thorough account of the acquisition of standards for self-evaluation, the maintenance of those standards and further motivation arising from the attainment of those standards (Bandura, 1976a), attempts to determine the superiority of self- or external reinforcement will be dismissed or at least assigned their proper emphasis in the development of appropriate self-regulation.

# REFERENCES

- Allen, M.K. & Liebert, R.M.: Effects of live and symbolic modelling cues on adoption of a previously learned standard Journal of Personality and Social Psychology, 1969, II, 253 - 260.
- Arlin, M.: The interaction of locus of control, classroom structure and pupil satisfaction Psychology in the Schools, 1975, 12, 279 - 286.
- Bandura, A.: Principles of Behavior Modification New York: Holt, Rinehart & Winston, 1969.
- Bandura, A.: The case of the mistaken dependent variable Journal of Abnormal Psychology, 1974a, 83, 301 - 303.
- Bandura, A.: Behavior theory and the models of man American Psychologist, 1974b, 29, 859 - 869.
- Bandura, A.: Self-efficacy: Toward a unifying theory of behavior change Psychological Review, 1976a, 84, 191 - 215.
- Bandura, A.: Self-reinforcement: Theoretical and methodological considerations Behaviorism, 1976b, 4, 135 - 155.
- Bandura, A.: Social Learning Theory New Jersey: Prentice-Hall, 1977.
- Bandura, A.: The self-system in reciprocal determinism American Psychologist, 1978, 33, 344 - 358.
- Bandura, A.: In search of pure unidirectional determinants Behavior Therapy, 1981, 12, 30 - 40.
- Bandura, A., Grusec, J.E. & Menlove, F.L.: Some social determinants of self-monitoring reinforcement systems Journal of Personality and Social Psychology, 1967, 5, 449 - 455.
- Bandura, A. & Kupers, C.J.: Transmission of patterns of self-reinforcement through modelling Journal of Abnormal and Social Psychology, 1964, 69, 1 - 9.
- Bandura, A. & Mahoney, M.J.: Maintenance and transfer of self-reinforcement functions Behavior Research and Therapy, 1974, 12, 89 - 97.
- Bandura, A., Mahoney, M.J. & Dirks, S.J.: Discriminative activation and maintenance of contingent self-

- reinforcement Behavior Research and Therapy, 1976, 14, 1 - 6.
- Bandura, A. & McDonald, F.J.: Influence of social reinforcement and the behavior of models in shaping children's moral judgements Journal of Abnormal and Social Psychology, 1963, 67, 274 - 281.
- Bandura, A. & Perloff, B.: Relative efficacy of self-monitored and externally imposed reinforcement systems Journal of Personality and Social Psychology, 1967, 7, III - II6.
- Bandura, A., Ross, D. & Ross, S.A.: Transmission of aggression through imitation of aggressive models Journal of Abnormal and Social Psychology, 1961, 65, 575 - 582.
- Bandura, A. & Simon, K.M.: The role of proximal intentions in self-regulation of refractory behavior Cognitive Therapy and Research, 1977, 1, 177 - 193.
- Bandura, A. & Whalen, C.: The influence of antecedent reinforcement and divergent modeling cues on patterns of self-reward Journal of Personality and Social Psychology, 1966, 3, 373 - 382.
- Farclay, J.R. & Wu, W-T.: Classroom climates in Taiwanese and American schools: A cross-cultural study Contemporary Educational Psychology, 1980, 5, 65 - 82.
- Barling, J.: Performance standards and reinforcement effects on children's academic performance: A test of social learning theory Cognitive Therapy and Research, 1980a, 4, 409 - 418.
- Barling, J.: A multi-stage multi-dependent variable assessment of children's self-regulation of academic performance Child Behavior Therapy, 1980b, 2, 43 - 54.
- Barling, J.: Self-determined performance standards and locus of control beliefs in children's academic performance British Journal of Educational Psychology, 1982, 52, 100 - 103.
- Barling, J. & Fincham, F.: Psychological adjustment and self-reinforcement style: A possible rapprochement

Unpublished manuscript.

- Farling, J. & Pincham, F.: Self-reinforcement behavior and dimensions of perceived locus of control Journal of Genetic Psychology, 1978a, 133, 147 - 148.
- Farling, J. & Pincham, F.: Locus of control beliefs in male and female Indian and White schoolchildren in South Africa Journal of Cross - Cultural Psychology, 1978b, 9, 227 - 235.
- Farling, J. & Pincham, F.: The effects of self and externally imposed reinforcement (material and social) on academic performance of above - average IQ children Journal of Genetic Psychology, in press.
- Farling, J. & Pats, M.: Differences following self- and external reinforcement as a function of locus of control and age: A social learning analysis Person and Individual Differences, 1980, 1, 79 - 85.
- Bellack, A.S.: Self-evaluation, self-reinforcement and locus of control Journal of Research in Psychology, 1975, 9, 156 - 167.
- Bellack, A.S., Glanz, L. & Simon, R.: Covert imagery and individual differences in self-reinforcement style in the treatment of obesity Journal of Consulting and Clinical Psychology, in press.
- Bellack, A.S. & Simon, R.: Positive and negative reinforcement behavior under different instructional restraints Journal of General Psychology, 1976, 95, 251 - 256.
- Bellack, A.S. & Tillman, W.: Effects of task and experimenter feedback on the self-reinforcement behavior of internals and externals Journal of Consulting and Clinical Psychology, 1974, 42, 330 - 336.
- Forrest, S.T.: Tasks and Social Relationships in Classrooms Cambridge: Cambridge University Press, 1979.
- Gottlieb, A.G.: Self-reinforcement revisited Behaviorism, 1976, 4, 157 - 162.
- Gottlieb, J.R.: Behavior therapy and self-control: Techniques and implications IN Franks, 1969.

- Conway, J.B.: Behavioral self-control of smoking through aversive conditioning and self-management Journal of Consulting and Clinical Psychology, 1977, 45, 348 - 357.
- Coop, R.H. & White, K. (eds): Psychological concepts in the classroom New York: Harper & Row, 1974.
- Coopersmith, S. & Feldman, R.: Fostering a positive self concept and high self-esteem in the classroom IN Coop & White, 1974.
- Crandall, V.C., Katkovsky, W. & Crandall, V.J.: Children's beliefs in the own control of reinforcement in intellectual - academic achievement situations Child Development, 1965, 36, 91 - 109.
- Cravens, R.W. & Forchel, P.: The differential effects of rewarding and coercive leaders on group members differing in locus of control Journal of Personality, 1977, 45, 150 - 168.
- Dember, W.N.: Motivation and the cognitive revolution American Psychologist, 1974, 29, 161 - 168.
- Dorsey, T.E., Kanfer, F.H. & Duerfeldt, P.H.: Task difficulty and non-contingent reinforcement schedules as factors in self-reinforcement Journal of Genetic Psychology, 1971, 84, 323 - 334.
- Drabman, R.S.: Child- versus teacher - administered token programs in a psychiatric hospital Journal of Abnormal Child Psychology, 1973, 1, 68 - 87.
- Dubren, R.: Self-reinforcement by recorded telephone messages to maintain nonsmoking behavior Journal of Consulting and Clinical Psychology, 1977, 45, 358 - 360.
- Edgar, R. & Clement, R.: Teacher-controlled and self-controlled reinforcement with underachieving black children Child Behavior Therapy, 1980, 2, 33 - 56.
- Ellis, A.: Can we change thoughts by reinforcement? A reply to Howard Rachlin Behavior Therapy, 1977, 8, 666 - 672.
- Endler, N.S.: The person versus the situation - a pseudo-issue? A response to Alker Journal of

- Personality, 1973, 41, 287 - 303.
- Endler, N.S. & Magnusson, D.: Toward an interactional psychology of personality Psychological Bulletin, 1976, 83, 956 - 974.
- Feingold, B.D. & Mahoney, M.J.: Reinforcement effects on intrinsic interest: Undermining the overjustification hypothesis Behavior Therapy, 1975, 6, 367 - 377.
- Felixbrod, J.J. & O'Leary, K.D.: Effects of reinforcement on children's academic behavior as a function of self-determined and externally imposed contingencies Journal of Applied Behavior Analysis, 1973, 6, 241 - 250.
- Felixbrod, J.J., O'Leary, K.D. & Kent, R.N.: The effects of self and external control of reinforcement on later performance Unpublished manuscript, 1976.
- Finch Jnr., A.J., Pezzuti, K.A. & Nelson III, W.M.: Locus of control and academic achievement in emotionally disturbed children Journal of Consulting and Clinical Psychology, 1975, 43, 103.
- Fincham, F. & Barling, J.: Locus of control and generosity in learning disabled, normal achieving and gifted children Child Development, 1978, 49, 530 - 533.
- Finlayson, D.S.: Measuring "school climate" Trends in Education, 1973, 30, 19 - 27.
- Fleischman, M.J. & Szykula, S.A.: A community setting replication of a social learning treatment for aggressive children Behavior Therapy, 1981, 12, 115 - 122.
- Franks, C.M. (ed): Behavior Therapy New York, McGraw-Hill, 1969.
- Goldiamond, I.: Self-reinforcement Journal of Applied Behavior Analysis, 1976, 9, 509 - 514.
- Good, T.L. & Brophy, J.E.: The influence of teacher's attitudes and expectancies on classroom behavior IN Coop & White, 1974.
- Gordon, D.A. & Bolick, T.: The role of self-reinforcement and causal attribution in children's task

- persistence Journal of Genetic Psychology, 1979, 135, 255 - 262.
- Greene, D.G.: Comment on Feingold and Mahoney's "Reinforcement effects on intrinsic interest: Undermining the overjustification hypothesis" Behavior Therapy, 1975, 6, 712 - 713.
- Grusec, J.E. & Kuczynski, L.: Teaching children to punish themselves and effects on subsequent compliance Child Development, 1977, 48, 1296 - 1300.
- Hamilton, V.J. & Gordon, D.A.: Teacher - child interactions in preschool and task persistence American Educational Research Journal, 1978, 15, 459 - 466.
- Harpin, P.M. & Sandler, I.N.: Interaction of sex, locus of control and teacher control: Toward a student - classroom match American Journal of Community Psychology, 1979, 7, 621 - 632.
- Henderson, R.W. & Hennig, H.: Relationships of co-operation, competition and locus of control in social and academic situations among children in traditional and open classrooms Contemporary Educational Psychology, 1979, 4, 121 - 131.
- Hersen, M.: Complex problems require complex solutions Behavior Therapy, 1981, 12, 15 - 29.
- Hertz-Lazarowitz, R. & Sharan, S.: Self-esteem, locus of control and children's perception of classroom social climate: A developmental perspective Contemporary Educational Psychology, 1979, 4, 154 - 161.
- Hildebrandt, D.E., Feldman, S.E. & Ditrichs, R.A.: Rules, models, and self-reinforcement in children Journal of Personality and Social Psychology, 1973, 25, 1 - 5.
- Hunter, C.P. & Meyers, C.E.: Classroom climate and pupil characteristics in special classes for the educationally handicapped Journal of School Psychology, 1972, 10, 25 - 32.
- Insel, P.M. & Moos, R.H.: Health and the Social Environment Lexington, Massachusetts: Heath & Co., 1974.
- Johnson, S.M.: Self-reinforcement versus external

- reinforcement in behavior modification with children Developmental Psychology, 1970, 3, 147 - 148.
- Jones, R.T.: External influences in self-reinforcement procedures with children Unpublished manuscript.
- Jones, R.T.: The role of external variables in self-reinforcement American Psychologist, 1980, 35, 102 - 103.
- Jones, R.T. & Evans, H.: Self-reinforcement: A continuum of external cues Journal of Educational Psychology, In press.
- Jones, R.T., Nelson, R.E. & Kazdin, A.E.: The role of external variables in self-reinforcement: A review Behavior Modification, 1977, 1, 147 - 178.
- Jones, R.T. & Ollendick, T.H.: Self-reinforcement: An assessment of external influences Journal of Behavioral Assessment, In press.
- Kanfer, F.H. & Duerfeldt, P.H.: Effects of pretraining on self-evaluation of self-reinforcement Journal of Personality and Social Psychology, 1967, 7, 164 - 168.
- Kanfer, F.H., Duerfeldt, P. & Lepage, A.: Stability patterns of self-reinforcement Psychological Reports, 1969, 24, 663 - 670.
- Kanfer, F.H. & Karoly, P.: Self-control: A behavioristic excursion into the lion's den Behavior Therapy, 1972, 3, 398 - 416.
- Kanfer, F.H. & Marston, A.R.: Conditioning of self-reinforcement response: An analogue to confidence training Psychological Reports, 1963a, 13, 63 - 70.
- Kanfer, F.H. & Marston, A.R.: Determinants of self-reinforcement in human learning Journal of Experimental Psychology, 1963b, 66, 245 - 254.
- Karan, O.C.: Self-reinforcement: An evaluative review Manuscript no. IOII. Abstracted in the JSAS Catalog of Selected Documents in Psychology, 1975, 5, 280.
- Karniol, R. & Ross, M.: The effects of performance-relevant and performance-irrelevant rewards on children's intrinsic motivation Child Development, 1977, 48, 482 - 487.

- Karoly, P.: Behavioral self-management in children: Concepts, methods, issues and directions IN Hersen, M., Eisler, R.M. & Miller, P.M. (eds).: Progress in Behavior Modification, 1977, 5, 197 - 262. New York: Academic Press.
- Kazdin, A.E.: Research issues in covert conditioning Cognitive Therapy and Research, 1977, 1, 45 - 58.
- Kazdin, A.E.: Fictions, factions and functions of behavior therapy Behavior Therapy, 1979, 10, 629 - 654.
- Kerlinger, F.N.: Foundations of Behavioral Research New York: Holt, Rinehart & Winston, 1973.
- Keyser, V. & Barling, J.: Determinants of children's self-efficacy beliefs in an academic environment Cognitive Therapy and Research, 1981, 5, 29 - 39.
- Kirsch, I.: Tangible self-reinforcement in self-directed behavior modification projects Psychological Reports, 1978, 43, 455 - 461.
- Kirschenbaum, D.S. & Karoly, P.: When self-reinforcement fails: Tests of some preliminary hypotheses Journal of Consulting and Clinical Psychology, 1975, 45, 1116 - 1125.
- Klein, J.: Can a child be self-reinforced? Journal of Psychology, 1978, 15, 45 - 47.
- Larson, G.C.: Effects of self-reinforcement on the demanding behaviors of a paranoid personality Journal of School Psychology, 1976, 14, 207 - 211.
- Lefcourt, H.M.: Locus of Control Hillsdale, N.J.: Lawrence Earlbaum, 1976.
- Lepper, M.R., Greene, D.G. & Nisbett, R.E.: Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification hypothesis" Journal of Personality and Social Psychology, 1973, 28, 129 - 137.
- Liberman, R.P.: Social and political challenges to the development of behavioral programs in organisations IN Sjöden, Bates and Dockens, 1979.
- Liebert, R.M. & Ora, J.: Children's adoption of self-

- reward patterns: Incentive levels and methods of transmission Child Development, 1968, 39, 537 - 544.
- Liebert, R.M., Spiegler, M.D. & Hall, M.: Effects of the value of contingent self-administered and non-contingent externally imposed reward on children's behavioral productivity Psychon. Sci., 1970, 18, 245 - 246.
- Mahoney, M.J.: Self-reward and self-monitoring techniques for weight control Behavior Therapy, 1974, 5, 48 - 57.
- Mahoney, M.J.: Reflections on the cognitive - learning trend in psychotherapy American Psychologist, 1977a, 32, 5 - 13.
- Mahoney, M.J.: Cognitive therapy and research: A question of questions Cognitive Therapy and Research, 1977b, 1, 5 - 16.
- Mahoney, M.J.: On the continuing resistance to thoughtful therapy Behavior Therapy, 1977c, 8, 673 - 677.
- Mahoney, M.J.: Cognitive and noncognitive views in behavior modification IN Sjöden, Bates & Dockens, 1979.
- Mahoney, M.J. & Bandura, A.: Self-reinforcement in pigeons Learning and Motivation, 1972, 3, 293 - 303.
- Mahoney, M.J., Bandura, A., Dirks, S.J. & Wright, C.L.: Relative preference for external and self-controlled reinforcement in monkeys Behavior Research and Therapy, 1974, 12, 157 - 163.
- Marston, A.R.: Personality variables related to self-reinforcement Journal of Psychology, 1964, 58, 169 - 175.
- Marston, A.R.: Self-reinforcement: The relevance of a concept in analogue research to psychotherapy Psychotherapy: Theory, Research and Practice, 1965a, 2, 1 - 5.
- Marston, A.R.: Imitation, self-reinforcement and reinforcement of another person Journal of Personality and Social Psychology, 1965b, 12, 255 - 261.
- Martin, J.: Laboratory studies of self-reinforcement (SR) phenomena Journal of General Psychology, 1979, 101, 103 - 149.

- Martin, J.: External versus self-reinforcement: A review of methodological and theoretical issues Canadian Journal of Behavioral Science/Rev. Canad. Sci. Comp., 1980, 12, III - I25.
- Masters, J.C. & Mokros, J.R.: Self-reinforcement processes in children IN Reese, W.H. (ed): Advances in Child Development and Behavior, 1974, 9, I5I - I87.
- McCullough, J.P., Huntsinger, G.M. & May, W.R.: Case-study: Self-control treatment of aggression in a I6-year old male Journal of Consulting and Clinical Psychology, 1977, 45, 322 - 33I.
- McMains, M.J. & Liebert, R.M.: Influence of discrepancies between successively modeled self-reward criteria on the adoption of a self-imposed standard Journal of Personality and Social Psychology, 1968, 8, I66 - I7I.
- Meichenbaum, D.H.: Cognitive behavior modification: An integrative approach New York: Plenum Press, 1977.
- Meichenbaum, D.H.: Cognitive-behavioral modification: Future directions IN Sjöden, Bates and Dockens, 1979.
- Michaels, J.W.: Classroom reward structure and academic performance Review of Educational Research, 1977, 47, 87 - 98.
- Miller, D.T. & Karniol, R.: The role of rewards in externally and self-imposed delay of gratification Journal of Personality and Social Psychology, 1976, 43, 594 - 600.
- Mischel, W.: Personality and Assessment New York: John Wiley & Sons, 1958.
- Mischel, W.: Toward a cognitive social learning conceptualization of personality Psychological Review, 1973, 80, 252 - 283.
- Mischel, W. & Liebert, R.M.: Effects of discrepancies between observed and imposed criteria on their acquisition and transmission Journal of Personality and Social Psychology, 1965, 2, 255 - 26I.
- Montgomery, G.T. & Parton, D.A.: Reinforcing effects of

- self-reward Journal of Experimental Psychology, 1970, 84, 273 - 276.
- Moore, B.S.: Cognitive representations of rewards in delay of gratification Cognitive Therapy and Research, 1977, I, 73 - 83.
- Moos, R.H.: Evaluating Treatment Environments New York: John Wiley & Sons, 1974a.
- Moos, R.H.: The Social Climate Scales Palo Alto, Calif.: Consulting Psychologists Press, 1974b.
- Moos, R.H.: A typology of junior - high and high school classrooms American Educational Research Journal, 1978, 15, 53 - 66.
- Moos, R.H. & Trickett, E.J.: Classroom Environment Scale Manual Palo Alto, Calif.: Consulting Psychologists Press, 1974.
- Morris, L.W.: Extraversion and Introversion Washington: Hemisphere Publishing Corp., 1979.
- Morris, S. & Messer, S.B.: The effects of locus of control and locus of reinforcement on academic task persistence Journal of Genetic Psychology, 1978, 132, 3 - 9.
- Morrison, T.L.: Classroom structure, work involvement and social climate in elementary classrooms Journal of Educational Psychology, 1979, 71, 471 - 477.
- Nelson Jnr., W.J. & Birkimer, J.C.: Role of self-instruction and self-reinforcement in the modification of impulsivity Journal of Consulting and Clinical Psychology, 1978, 46, 183.
- Nielson, H.D. & Moos, R.H.: Exploration and adjustment in high school classrooms: A study of person - environment fit Journal of Educational Research, 1978, 72, 52 - 57.
- O'Leary, K.D. & O'Leary, S.G. (eds): Classroom Management: The successful use of behavior modification (2nd ed) New York: Pergamon Press, 1977.
- Parent, J., Forward, J., Canter, R. & Mohling, J.: Interactive effects of teaching strategy and personal locus

- of control on student performance and satisfaction  
Journal of Educational Psychology, 1975, 67, 764 - 769.
- Parker, F.C., Parker, L.H. & Christian, W.P.: A re-examination of the overjustification hypothesis under external and self-reinforcement conditions Behavior Modification, In press.
- Patterson, G.R.: Behavioral techniques based upon social learning IN Franks, 1969.
- Perry, D.G. & Bussey, K.: Self-reinforcement in high- and low-aggressive boys following acts of aggression  
Child Development, 1977, 48, 653 - 657.
- Pervin, L.A.: Performance and satisfaction as a function of individual - environment fit Psychological Bulletin, 1968, 69, 56 - 68.
- Phares, E.J.: Locus of Control in Personality Morristown, N.J.: General Learning Press, 1976.
- Premack, D. & Anglin, B.: On the possibilities of self-control in man and animals Journal of Abnormal Psychology, 1973, 83, 137 - 151.
- Rachlin, H.: Reinforcing and punishing thoughts Behavior Therapy, 1977a, 8, 659 - 665.
- Rachlin, H.: Reinforcing and punishing thoughts: A rejoinder to Ellis and Mahoney Behavior Therapy, 1977b, 8, 678 - 681.
- Rosenbaum, M.S. & Drabman, R.S.: Self-control training in the classroom: A review and critique Journal of Applied Behavior Analysis, 1979, 12, 467 - 485.
- Rozensky, R.H. & Bellack, A.S.: Individual differences in self-reinforcement style and performance in self- and therapist controlled weight reduction programs  
Behavior Research and Therapy, 1976, 14, 357 - 364.
- Ruedi, J. & West, C.K.: Pupil self-concept in an "open" and in a "traditional" school Psychology in the Schools, 1973, 10, 48 - 53.
- Schlechty, P.: Power and influence variables in the classroom: An introduction IN Coop & White, 1976.  
Scholastic Achievement Test in Arithmetic (SATA)

- of control on student performance and satisfaction  
Journal of Educational Psychology, 1975, 67, 764 - 769.
- Parker, F.C., Parker, L.H. & Christian, W.P.: A re-examination of the overjustification hypothesis under external and self-reinforcement conditions Behavior Modification, In press.
- Patterson, G.R.: Behavioral techniques based upon social learning IN Franks, 1969.
- Perry, D.G. & Bussey, K.: Self-reinforcement in high- and low-aggressive boys following acts of aggression  
Child Development, 1977, 48, 653 - 657.
- Pervin, L.A.: Performance and satisfaction as a function of individual - environment fit Psychological Bulletin, 1968, 69, 56 - 68.
- Phares, E.J.: Locus of Control in Personality Morristown, N.J.: General Learning Press, 1976.
- Premack, D. & Anglin, B.: On the possibilities of self-control in man and animals Journal of Abnormal Psychology, 1973, 83, 137 - 151.
- Rachlin, H.: Reinforcing and punishing thoughts Behavior Therapy, 1977a, 8, 659 - 665.
- Rachlin, H.: Reinforcing and punishing thoughts: A rejoinder to Ellis and Mahoney Behavior Therapy, 1977b, 8, 678 - 681.
- Rosenbaum, M.S. & Drabman, R.S.: Self-control training in the classroom: A review and critique Journal of Applied Behavior Analysis, 1979, 12, 467 - 485.
- Rozensky, R.H. & Bellack, A.S.: Individual differences in self-reinforcement style and performance in self- and therapist controlled weight reduction programs  
Behavior Research and Therapy, 1976, 14, 357 - 364.
- Ruedi, J. & West, C.K.: Pupil self-concept in an "open" and in a "traditional" school Psychology in the Schools, 1973, 10, 48 - 53.
- Schlechty, P.: Power and influence variables in the classroom: An introduction IN Coop & White, 1976.
- Scholastic Achievement Test in Arithmetic (SATA)

- Institute for Psychometric Research, Human Sciences Research Council, Pretoria, 1974.
- Schunk, D.H.: Modeling and attributional effects on children's achievement: A self-efficacy analysis Journal of Educational Psychology, 1981, 73, 93 - 105.
- Serow, R.C. & Solomon, D.: Classroom climates and student's intergroup behavior Journal of Educational Psychology, 1979, 71, 669 - 676.
- Sjöden, P.O., Bates, S. & Dockens, W.S. (eds): Trends in Behavior Therapy New York: Academic Press, 1979.
- Skinner, B.F.: Science and Human Behavior New York: McMillan, 1953.
- Skinner, B.F.: Beyond Freedom and Dignity Hammondsworth, Middlesex: Penguin Books, 1971.
- Skinner, B.F.: About Behaviorism New York: Alfred E Knopf, 1974.
- Solomon, D. & Oberlander, M.I.: Locus of control in the classroom IN Coop & White, 1974.
- Spiedel, G.E.: Motivating effects of contingent self-reward Journal of Experimental Psychology, 1974, 102, 528 - 530.
- Spiedel, G.E. & Thorp, R.G.: What does self-reinforcement reinforce? An empirical analysis of the contingencies in self-determined reinforcement Child Behavior Therapy, 1980, 2, 1 - 22.
- Stouwie, R.J., Hetherington, E.M. & Parke, R.D.: Some determinants of children's behavior after exposure to discrepant reward criteria Developmental Psychology, 1970, 3, 313 - 319.
- Switzky, H.N. & Haywood, H.C.: Motivational orientation and the relative efficacy of self-monitored and externally imposed reinforcement systems in children Journal of Personality and Social Psychology, 1974, 30, 360 - 366.
- Taylor, F.G. & Marshall, W.L.: Experimental analysis of a cognitive - behavioral therapy for depression Cognitive Therapy and Research, 1977, 1, 59 - 72.

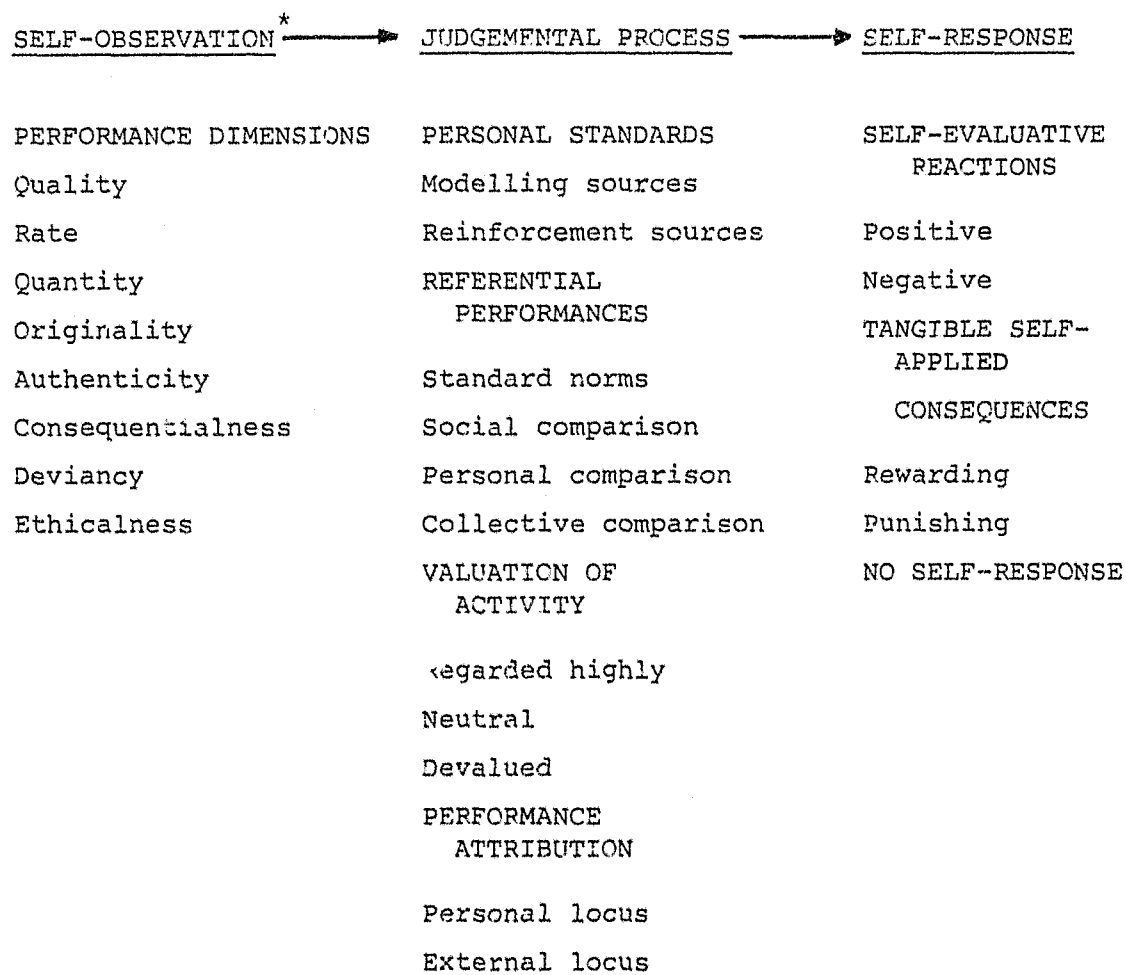
- Trickett, E.J. & Moos, R.H.: The social environment of junior high and high school classrooms Journal of Educational Psychology, 1973, 65, 93 - 102.
- Trickett, E.J. & Moos, R.H.: Personal correlates of contrasting environments: Student satisfactions in high school classrooms American Journal of Community Psychology, 1974, 2, I - II.
- Trickett, E.J. & Quinlan, D.M.: Three domains of classroom environment - Factor analysis of the Classroom Environment Scale American Journal of Community Psychology, 1979, 7, 279 - 291.
- Turkewitz, H., O'Leary, K.D. & Ironsmith, M.: Generalization and maintenance of appropriate behavior through self-control Journal of Consulting and Clinical Psychology, 1975, 43, 577 - 583.
- Waller, D. & Zuckerman, J.: Motivation in the classroom IN Coop. J., 1974.
- Weiner, B.: Principles of Motivation Chicago: Rand McNally, 1972.
- White, W.F. (ed): Psychological Principles Applied to Classroom Teaching New York: McGraw-Hill, 1969.
- Wilson, K.W.: A distribution - free test of analysis of variance hypotheses Psychological Bulletin, 1956, 53, 95 - 101.
- Winston, A.S., Torney, D. & Labbee, P.: Children's self-management: Some evidence for maximization of payoff and minimization of effort Child Development, 1975, 46, 882 - 884.
- Withall, J.: The development of a technique for the measurement of social - emotional climate in classrooms Journal of Experimental Education, 1949, 17, 347 - 361.
- Withall, J.: The development of the climate index Journal of Educational Research, 1951, 45, 93 - 99.
- Wolk, S.: Situational constraints as a moderator of the locus of control - adjustment relationship Journal of Consulting and Clinical Psychology, 1976, 44, 420 - 427.

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APPENDIX A :

Component processes in the self-regulation of behavior<sup>a</sup> :



<sup>a</sup> From Bandura, 1978, p. 349 and Bandura, 1977, p. 120

<sup>\*</sup> Arrows indicate direction of the self-regulation process

APPENDIX B :NAME:..... STANDARD:.....INSTRUCTIONS:

Please ring the letter, (a) or ( b) which you think is the right answer for you, that is, the answer which shows what you think or feel most closely resembles what you would say :

1. If a teacher passes you to the next standard, would it probably be
  - (a) because she liked you, or
  - (b) because of the work you did?
2. When you do well on a test at school, is it more likely to be
  - (a) because you studied for it, or
  - (b) because the test was very easy?
3. When you have trouble understanding something at school, is it usually
  - (a) because the teacher didn't explain it clearly, or
  - (b) because you didn't listen carefully?
4. When you read a story and can't remember much of it, is it usually
  - (a) because the story wasn't well written, or
  - (b) because you weren't interested in the story?
5. Suppose your parents say you are doing well in school. Is it likely to happen
  - (a) because your school work is good, or
  - (b) because they are in a good mood?
6. Suppose you did better than usual in a subject at school. Would it probably happen
  - (a) because you tried harder, or
  - (b) because someone helped you?
7. When you lose at a game of cards or chess, does it usually happen
  - (a) because the other player is good at the game, or
  - (b) because you don't play well?
8. Suppose a person doesn't think you are very bright or clever.
  - (a) can you make him/her change his/her mind if you try to, or
  - (b) are there some people who will think you are not very bright no matter what you do?
9. If you solve a puzzle quickly, is it
  - (a) because it wasn't a very hard puzzle, or
  - (b) because you worked on it carefully?
10. If a boy or girl tells you that you are dumb or stupid, is it more likely that they say that
  - (a) because they are cross with you, or
  - (b) because what you do is not very bright or clever?
11. Suppose you study to become a teacher, scientist, or doctor and you fail. Do you think it would happen
  - (a) because you didn't work hard enough, or
  - (b) because you needed some help and other people didn't give it to you?

12. When you learn something quickly in school, is it usually
  - (a) because you listened carefully, or
  - (b) because the teacher explained it clearly?
13. If a teacher says to you "Good work", is it
  - (a) something teachers usually say to encourage pupils, or
  - (b) because you did a good job?
14. When you find it hard to work math problems at school, is it
  - (a) because you didn't learn hard enough before you tried them, or
  - (b) because the teacher gave you problems that were too hard?
15. When you forgot something you heard in class, is it
  - (a) because the teacher didn't explain it very well, or
  - (b) because you didn't try very hard to remember?
16. Suppose you weren't sure about the answer to a question your teacher asked you, but your answer was right. Is it likely to happen
  - (a) because she wasn't as particular as usual, or
  - (b) because you gave the best answer you could think of?
17. When you read a story and remember most of it, is it usually
  - (a) because you were interested in the story, or
  - (b) because the story was well written?
18. If your parents tell you you're acting silly and not thinking clearly, is it more likely to be
  - (a) because of something you did, or
  - (b) because they happen to be feeling cranky?
19. When you don't do well on a test at school, is it
  - (a) because the test was especially hard, or
  - (b) because you didn't study for it?
20. When you win at a game of cards or chess, does it happen
  - (a) because you played really well, or
  - (b) because the other person didn't play well?
21. If people think you are bright or clever, is it
  - (a) because they happen to like you, or
  - (b) because you usually act that way?
22. If a teacher didn't pass you to the next standard, is it
  - (a) because "she had it in for you", or
  - (b) because your school work isn't good enough?
23. Suppose you don't do as well as usual in a subject at school. Would this probably happen
  - (a) because you weren't as careful as usual, or
  - (b) because somebody bothered you and kept you from working?
24. If a boy or girl tells you that you are clever, is it usually
  - (a) because you thought up a good idea, or
  - (b) because they like you?

25. Suppose you became a famous teacher, scientist or doctor. Do you think this would happen  
(a) because other people helped you when you needed it, or  
(b) because you worked hard?
26. Suppose your parents say you aren't doing well in your school work. Is this likely to happen more  
(a) because your school work isn't very good, or  
(b) because they are feeling cranky?
27. Suppose you are showing a friend how to play a game and he/she has trouble with it. Would it happen  
(a) because he/she wasn't able to understand how to play, or  
(b) because you couldn't explain it well?
28. When you find it easy to work math problems at school, is it  
(a) because the teacher gave you especially easy problems, or  
(b) because you studied your book well before you tried them?
29. When you remember something you heard in class, is it usually  
(a) because you tried hard to remember, or  
(b) because the teacher explained it well?
30. If you can't work a puzzle, is it more likely to happen  
(a) because you are not good at working puzzles, or  
(b) because the instructions weren't written clearly enough?
31. If your parents tell you that you are bright or clever, is it more likely  
(a) because they are feeling good, or  
(b) because of something you did?
32. Suppose you are explaining how to play a game to a friend and he/she learns quickly. Would that happen more often  
(a) because you explained it well, or  
(b) because he/she was able to understand it?
33. Suppose you are not sure about the answer to a question your teacher asks you and the answer turns out to be wrong. Is it likely to happen  
(a) because she was more careful than usual, or  
(b) because you answered too quickly?
34. If a teacher says to you, "Try to do better", would it be  
(a) because this is something she might say to get pupils to try harder, or  
(b) because your work wasn't as good as usual?

Thank-you very much for filling in this form. It will be a great help to us!

## APPENDIX C :

QUESTIONNAIRE

NAME:..... STANDARD:.....

Below are a number of sentences describing different things about classrooms, teachers and students. If you think that the sentence describes things that happen in your classroom then put a ring around the T (true) letter next to the sentence. If you think that the sentence does not describe anything about your classroom, then put a ring around the F (false) letter next to that sentence. Please make sure that you do every sentence. There are no right or wrong answers. The letter, T or F, that you circle are just to show how you feel about your classroom.

- |                                                                                   |   |   |
|-----------------------------------------------------------------------------------|---|---|
| 1. Students put a lot of energy into what they do here.                           | T | F |
| 2. Students in this class have got to know each other very well.                  | T | F |
| 3. This teacher spends very little time just talking to the students.             | T | F |
| 4. Almost all class time is spent on the lessons for that day.                    | T | F |
| 5. Students don't feel they have to compete here.                                 | T | F |
| 6. This is a well organised class.                                                | T | F |
| 7. This class has a clear set of rules which the students have to follow.         | T | F |
| 8. There are very few rules in this class.                                        | T | F |
| 9. New ideas are always tried out here.                                           | T | F |
| 10. Students daydream a lot in this class.                                        | T | F |
| 11. Students in this class are not very interested in getting to know each other. | T | F |
| 12. The teacher takes a personal interest in students in this class.              | T | F |
| 13. Students are expected to stick to classwork in this class.                    | T | F |
| 14. Students try hard to get the best marks here.                                 | T | F |
| 15. Students are almost always quiet in this class.                               | T | F |
| 16. Rules in this class seem to change a lot.                                     | T | F |
| 17. If a student breaks a rule in this class, he/she is sure to get into trouble. | T | F |
| 18. What students do in this class is very different on different days.           | T | F |
| 19. Students often "watch-the-clock" in this classroom.                           | T | F |

- |                                                                                                                                                   |   |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---|---|
| 20. A lot of friendships are made in this classroom.                                                                                              | T | F |
| 21. The teacher is more like a friend in this class.                                                                                              | T | F |
| 22. We often spend more time talking about outside student activities, eg sport, than about class-related material, eg arithmetic, in this class. | T | F |
| 23. Some students always try to see who can answer questions first.                                                                               | T | F |
| 24. Students fool around a lot in this class.                                                                                                     | T | F |
| 25. The teacher explains what will happen to students if they break one of the rules here.                                                        | T | F |
| 26. The teacher is not very strict.                                                                                                               | T | F |
| 27. New and different ways of teaching are not tried very often in this class.                                                                    | T | F |
| 28. Most students in this class really pay attention to what the teacher is saying.                                                               | T | F |
| 29. It is easy to get a group together to work on a project here.                                                                                 | T | F |
| 30. The teacher goes out of his/her way to help students.                                                                                         | T | F |
| 31. Getting a certain amount of classwork done is very important in this class.                                                                   | T | F |
| 32. Students don't compete with each other here.                                                                                                  | T | F |
| 33. This class is often very, very noisy.                                                                                                         | T | F |
| 34. The teacher always explains what the rules are.                                                                                               | T | F |
| 35. Students get into trouble with the teacher for talking when they are not supposed to.                                                         | T | F |
| 36. The teacher likes students to try unusual projects.                                                                                           | T | F |

\*\*\*\*\*

Thank-you very much for helping me by completing this questionnaire. I greatly appreciate it.

APPENDIX D: Scholastic Achievement Test in Arithmetic  
Standard Three

Forms A and B are identical except that the answers and corresponding letters are transposed. The letters in brackets are form B format.

Test I:

I. Calculate:  $25 + 7 + 9 + 8 + 6 + 4 + 5$

| A (A) | B (E) | C (D) | D (C) | E (B) |
|-------|-------|-------|-------|-------|
| 63    | 54    | 64    | 55    | 74    |

2. Add:

|               |
|---------------|
| R 25.64       |
| R 9.84        |
| R 36.59       |
| <u>R 2.73</u> |
| <u>R</u>      |

| A (A)   | B (E)   | C (C)   | D (D)   | E (B)   |
|---------|---------|---------|---------|---------|
| R 74,60 | R 74,80 | R 54,80 | R 64,70 | R 72,79 |

3. Multiply:  $27$   
X 36  
——

| A (D) | B (B) | C (C) | D (A) | E (E) |
|-------|-------|-------|-------|-------|
| 263   | 972   | 2 736 | 243   | 9 720 |

4. Calculate:  $I5 - 8 + II - 9 - 6 + 7$

| A (D) | B (E) | C (C) | D (A) | E (B) |
|-------|-------|-------|-------|-------|
| II    | 56    | 0     | IO    | 9     |

5. Calculate:  $IO7 - 8 - 7 - 6 - 5 - 9 - 3$

| A (D) | B (B) | C (C) | D (A) | E (E) |
|-------|-------|-------|-------|-------|
| 69    | 96    | 59    | 79    | 67    |

6. Subtract: 8 00I metres  
4 908 metres  
—— metres

| A (C) | B (E) | C (A) | D (D) | E (B) |
|-------|-------|-------|-------|-------|
| 3 093 | 4 093 | 3 IO3 | 3 I93 | 4 907 |

7. Calculate:  $(I4 + I7 - I9 + 8 - 2) \div 9$

| A (D)   | B (E) | C (C)   | D (A)   | E (E) |
|---------|-------|---------|---------|-------|
| 2 rem I | 3     | I rem 8 | 2 rem 2 | 2     |

8. Multiply: R I.70

$$\begin{array}{r} \times 38 \\ \hline \end{array}$$

| A (E)   | B (D)    | C (C)    | D (B)   | E (A)   |
|---------|----------|----------|---------|---------|
| R I8.70 | R I87.00 | R 646.00 | R 64.60 | R 54.60 |

9. Calculate:  $\frac{7}{8} - \frac{3}{4}$

| A (B)         | B (A)         | C (C) | D (E)         | E (D)         |
|---------------|---------------|-------|---------------|---------------|
| $\frac{3}{4}$ | $\frac{I}{8}$ | I     | $\frac{3}{8}$ | $\frac{I}{2}$ |

IO. Multiply: 7 metres I2 centimetres by 9

| A (C)    | B (A)  | C (D)   | D (B)  | E (E)  |
|----------|--------|---------|--------|--------|
| 63mI08cm | 6m48cm | 63Im8cm | 63m8cm | 64m8cm |

II. Calculate:  $\frac{9}{I0} - \frac{3}{5}$

| A (D)         | B (B)          | C (E)          | D (A)         | E (C)          |
|---------------|----------------|----------------|---------------|----------------|
| $\frac{6}{5}$ | $\frac{6}{I5}$ | $\frac{3}{I0}$ | $\frac{3}{5}$ | $\frac{6}{I0}$ |

I2. How many minutes are there in  $\frac{3}{5}$  of I hour?

| A (E) | B (B) | C (D) | D (C) | E (A) |
|-------|-------|-------|-------|-------|
| 36    | 2 I60 | 30    | I5    | 72    |

I3. How many <sup>centi-</sup>metres are there in  $\frac{7}{I0}$  of I metre?

| A (A)          | B (B)           | C (E) | D (D) | E (C) |
|----------------|-----------------|-------|-------|-------|
| $\frac{7}{I0}$ | $\frac{7}{I00}$ | 7     | 700   | 70    |

I4. Divide:

$$\begin{array}{r} \text{remainder} \\ 23 \overline{) I 743} \end{array}$$

| A (C)    | B (E)   | C (A)   | D (D)    | E (B)    |
|----------|---------|---------|----------|----------|
| 75 r. 28 | 75 r. 8 | 76 r. 8 | 75 r. I8 | 76 r. I8 |

15. Divide:  $\frac{R}{7/R} 39.4\bar{I}$

|       |        |        |            |         |
|-------|--------|--------|------------|---------|
| A (C) | B (E)  | C (A)  | D (D)      | E (B)   |
| R 563 | R 5.53 | R 5.63 | R 5.10 r2c | R 56.30 |

16. I knife costs 50 cents. I2 such knives cost ...

|        |       |        |        |       |
|--------|-------|--------|--------|-------|
| A (C)  | B (B) | C (A)  | D (E)  | E (D) |
| R 5.10 | R 600 | R 5.00 | R 6.00 | R 60  |

17. Calculate:  $\frac{7}{10} + \frac{9}{100}$

|                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|
| A (E)            | B (B)            | C (C)            | D (D)            | E (A)            |
| $\frac{16}{100}$ | $\frac{16}{110}$ | $\frac{99}{100}$ | $\frac{79}{110}$ | $\frac{79}{100}$ |

18. I kilogram - 50 grams = ... grams

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (C) | C (E) | D (D) | E (A) |
| 150   | 950   | 50    | 9 950 | 1 050 |

19. Calculate:  $\frac{1}{3} + \frac{1}{6}$

|               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|
| A (E)         | B (D)         | C (C)         | D (B)         | E (A)         |
| $\frac{2}{9}$ | $\frac{1}{2}$ | $\frac{2}{6}$ | $\frac{2}{3}$ | $\frac{4}{9}$ |

20. How many litres are there in 5 kilolitres 3 litres ?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (B) | C (D) | D (C) | E (A) |
| 5 300 | 503   | 53    | 5 003 | 5 030 |

## Test 2:

1. Which one of the following quantities is nearest to 5 000 litres?

|                 |                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| A (A)           | B (E)           | C (D)           | D (C)           | E (B)           |
| 4 995<br>litres | 5 002<br>litres | 4 998<br>litres | 5 003<br>litres | 4 999<br>litres |

2. Look at this addition sum: ...

375

994 answer

What should be in place of ...

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (A) | B (D) | C (E) | D (B) | E (C) |
| 519   | 1 369 | 619   | 1 269 | 629   |

This picture shows how the number of children in a new school increased in the course of 5 years. Each column shows how many children there were at the end of each year.

Each small block  denotes 50 children.



Look at this picture and then answer the following two questions.

3. How many children were there in the school at the end of I969?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (A) | B (D) | C (E) | D (B) | E (C) |
| 600   | 650   | 500   | 450   | 550   |

4. How many pupils were there more in I970 than in in I969 in the school?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (C) | C (B) | D (A) | E (E) |
| 200   | 600   | 50    | 100   | 650   |

5. Look at this multiplication sum:
- $$\begin{array}{r} 1027 \\ \times 4 \\ \hline \end{array}$$

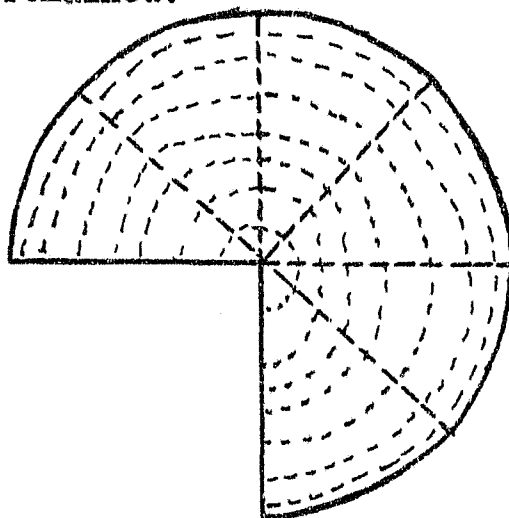
4 828 answer

What is the value of the 2 that has been carried in this sum?

|       |       |          |           |         |
|-------|-------|----------|-----------|---------|
| A (C) | B (B) | C (A)    | D (D)     | E (E)   |
| 2     | 2     | 2        | 2         |         |
| units | ones  | hundreds | thousands | nothing |

6. Mrs. Mullins gave a part of this round cake to her children.

The shaded part remained.



What part did she give them?

|               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|
| A (E)         | B (B)         | C (D)         | D (C)         | E (A)         |
| $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{6}$ | $\frac{3}{4}$ | $\frac{1}{8}$ |

7. Which one of the following fractions is nearest to the whole number 1?

|               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|
| A (C)         | B (D)         | C (A)         | D (B)         | E (E)         |
| $\frac{1}{4}$ | $\frac{5}{8}$ | $\frac{1}{2}$ | $\frac{3}{8}$ | $\frac{3}{4}$ |

8. If  $30 \times 25 = A$  and  $3 \times 25 = B$ ,  
how much is  $A + B$ ?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (E) | C (D) | D (A) | E (B) |
| 1 000 | 100   | 675   | 25    | 10    |

9. Which fraction should be in the place of ...?  
... of R 12 = R 9

|               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|
| A (A)         | B (D)         | C (E)         | D (B)         | E (C)         |
| $\frac{5}{8}$ | $\frac{3}{4}$ | $\frac{1}{4}$ | $\frac{2}{3}$ | $\frac{5}{6}$ |

10. How many dolls costing 15 cents each can be bought for R 3?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (B) | B (E) | C (D) | D (C) | E (A) |
| 200   | 2     | 5     | 20    | 45    |



II. Which one of the following sentences may possibly be true?

- A During a car race the winner's car travelled at an average speed of 100 centimetres per hour.
- B Yesterday father jumped a distance of 25 metres.
- C Mr. Garvie easily walks 50 kilometres in an hour.
- D Our house is 73 centimetres high.
- E Mr. Robertson's diningroom table is 2 metres long.

I2. Which number should be in place of ....?

$\frac{1}{3}$  of .... litres = 3 litres.

- |       |               |       |       |       |
|-------|---------------|-------|-------|-------|
| A (E) | B (B)         | C (D) | D (C) | E (A) |
| 1     | $\frac{4}{3}$ | 9     | 3     | 6     |

I3. Which number should be in place of ....?

R 9.20 x .... = R 920.00

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (A) | B (D) | C (E) | D (B) | E (C) |
| 900   | 100   | 10    | 1 000 | 20    |

I4. Divide the value of the 6 by the value of the 2 of the number 6 234.

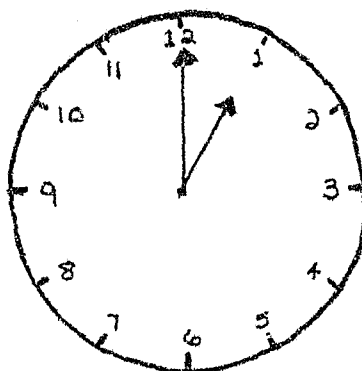
What is your answer?

- |       |       |        |       |       |
|-------|-------|--------|-------|-------|
| A (D) | B (B) | C (E)  | D (A) | E (C) |
| 30    | 3     | 30 000 | 300   | 3 000 |

I5. Write the natural number 16 as a number with base 5.

- |                 |                    |                   |                    |                    |
|-----------------|--------------------|-------------------|--------------------|--------------------|
| A (C)           | B (B)              | C (A)             | D (E)              | E (D)              |
| $3 \frac{1}{5}$ | $32_{\text{five}}$ | $8_{\text{five}}$ | $13_{\text{five}}$ | $31_{\text{five}}$ |

I6.



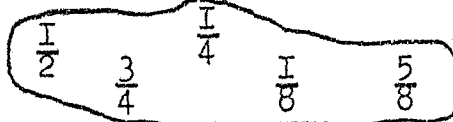
My watch regularly loses  $\frac{1}{4}$  minute every day.  
How many minutes does it lose in 12 days?

- |       |       |               |       |       |
|-------|-------|---------------|-------|-------|
| A (E) | B (C) | C (B)         | D (A) | E (D) |
| 48    | 3     | $\frac{1}{3}$ | 4     | 6     |

I7. Which number must be divided by 8 to get 16 as the answer?

- |       |       |               |       |       |
|-------|-------|---------------|-------|-------|
| A (A) | B (E) | C (D)         | D (C) | E (B) |
| 128   | 2     | $\frac{1}{2}$ | 24    | 8     |

I8. What is the difference between the biggest element and the smallest element of this set?



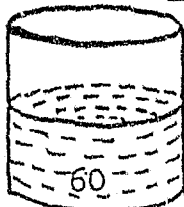
- |               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|
| A (E)         | B (C)         | C (B)         | D (D)         | E (A)         |
| $\frac{1}{4}$ | $\frac{5}{8}$ | $\frac{1}{2}$ | $\frac{3}{8}$ | $\frac{7}{8}$ |

I9. Which fraction should be in the place of ....?

$$\frac{2}{3} + \dots = \frac{5}{6}$$

- |               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|
| A (E)         | B (C)         | C (D)         | D (B)         | E (A)         |
| $\frac{3}{6}$ | $\frac{9}{6}$ | $\frac{7}{9}$ | $\frac{3}{3}$ | $\frac{1}{6}$ |

20. After a trader had tapped  $\frac{2}{3}$  of the vinegar from a full barrel, a total of 60 litres of vinegar remained. How many litres of vinegar did the barrel contain when it was full?



- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (D) | C (A) | D (B) | E (E) |
| 60    | 100   | 40    | 180   | 120   |

Test 3:

- I. During a school fête, pancakes were sold for 5 cents each.

How many pancakes were sold to make R 5?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (B) | C (D) | D (C) | E (A) |
| 1     | 10    | 1 000 | 55    | 100   |

2. Dad picked some figs.

He gave  $\frac{1}{4}$  of them to Aunt Hannah and had 15 left.

How many figs did he pick altogether?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (D) | C (A) | D (E) | E (B) |
| 60    | 10    | 20    | 45    | 30    |

3. My car goes 11 kilometres on every litre of petrol. How many kilometres can I travel with 12 litres of petrol?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (D) | C (E) | D (B) | E (A) |
| 140   | 132   | 122   | 144   | 121   |

4. Our hens laid 48 eggs this week. Mother sold  $\frac{3}{4}$  of the eggs. How many eggs did she sell?

|       |       |       |                 |       |
|-------|-------|-------|-----------------|-------|
| A (C) | B (E) | C (A) | D (D)           | E (B) |
| 12    | 36    | 64    | $47\frac{1}{4}$ | 4     |

5. On the 31 May 1970 Sam was 11 years old. When was he born?

|             |             |             |             |             |
|-------------|-------------|-------------|-------------|-------------|
| A (E)       | B (D)       | C (C)       | D (B)       | E (A)       |
| 31 May 1959 | 31 May 1960 | 31 May 1958 | 31 May 1957 | 31 May 1956 |

6. Sam has  $\frac{2}{3}$  of 15 cents but Peter has 14 cents more than Sam. How many cents has Peter?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (B) | B (A) | C (D) | D (E) | E (C) |
| 24    | 30    | 14    | 34    | 20    |

7. A fruit hawker sold his peaches at 30c per packet. One day he sold peaches for a total of R 3.60. How many packets of peaches did he sell that day?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (C) | C (E) | D (A) | E (B) |
| 12    | 108   | 30    | 120   | 10    |

8. A farmer had 4 sheep-kraals. When he put all his sheep into these kraals there were 150 sheep in each one. He then built another 2 kraals. How many sheep must he now put into each kraal if he wants an equal number of sheep in each kraal and he still has the same number of sheep?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (B) | C (A) | D (E) | E (D) |
| 100   | 140   | 120   | 135   | 145   |

9. A tank that can hold 1 000 litres of water, is quite full. Then a quarter of the water is tapped. How many litres of water are needed to fill the tank again?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (C) | C (B) | D (A) | E (D) |
| 750   | 675   | 250   | 500   | 850   |

10. You have to walk 6 kilometres to school. You walk 4 kilometres in 1 hour. At what time must you leave home to be at school by 8 o'clock?

|               |               |                      |                    |                 |
|---------------|---------------|----------------------|--------------------|-----------------|
| A (B)         | B (A)         | C (C)                | D (E)              | E (D)           |
| seven o'clock | half past six | a quarter past seven | a quarter to seven | half past seven |

11. Millie divided all her cents into 3 equal heaps. There were 17 cents in each heap. Her mother then added 3 cents to each heap. How many cents did Millie then have altogether?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (C) | C (E) | D (A) | E (B) |
| 51    | 20    | 54    | 60    | 102   |

12. If 36 bananas cost 60 cents, what will 12 bananas cost?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (B) | C (A) | D (E) | E (D) |
| 20c   | 48c   | 180c  | 5c    | 36c   |

13. Gerald's mass is twice as much as his little dog's. The little dog's mass is 10 kilograms. Mr. Blake's mass is 60 kilograms more than Gerald's. How many kilograms is Mr. Blake's mass?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (E) | C (B) | D (A) | E (C) |
| 80    | 70    | 90    | 100   | 120   |

14. There are 400 children in a school. Only 1/10 of them do not take part in sport. How many of these children do take part in sport?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (B) | C (E) | D (A) | E (C) |
| 320   | 40    | 80    | 100   | 360   |

- I5. Mr. Wilkinson earns R 95 every week. He saved  $\frac{1}{5}$  of this money every week. How much money did he save every week?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (C) | C (D) | D (B) | E (A) |
| R 19  | R 17  | R 38  | R 76  | R 78  |

- I6. A farmer had 7 spans of oxen. In each span there were 16 oxen. He then sold 48 of his oxen. How many spans of 16 (in each span) did he still have?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (A) | B (C) | C (B) | D (E) | E (D) |
| 5     | 4     | 3     | 6     | 2     |

- I7. A shopkeeper had 87 kilograms of rice in his shop. He wanted to make it up into packets that would contain 5 kilograms of rice in each. He found that he could not fill the last packet. How many kilograms of rice did he put into that packet?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (E) | C (D) | D (A) | E (B) |
| 17    | 18    | 3     | 1     | 2     |

- I8. There are 50 kilograms of cement in each pocket. How many pockets does a factory need to pack 1 000 kilograms of cement?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (B) | C (D) | D (C) | E (A) |
| 25    | 20    | 15    | 30    | 200   |

- I9. One night Billy slept from 9.30 p.m. until 6.30 a.m. How long did he sleep?

|         |          |                      |         |         |
|---------|----------|----------------------|---------|---------|
| A (B)   | B (A)    | C (C)                | D (E)   | E (D)   |
| 8 hours | 10 hours | $8\frac{1}{2}$ hours | 9 hours | 3 hours |

20. Together Maisie and Cathy had R 9. Maisie had R 3 more than Cathy. How much money did Cathy have?

|       |       |        |        |       |
|-------|-------|--------|--------|-------|
| A (D) | B (A) | C (E)  | D (B)  | E (C) |
| R 6   | R 9   | R 4.50 | R 1.50 | R 3   |

APPENDIX E: Scholastic Achievement Test in Arithmetic  
Standard Four

Forms A and B are identical except that the answers and corresponding letters are transposed. The letters in brackets are form B format.

Test I:

1. Calculate:  $2.25 \times (36 \div 12)$

| A (D) | B (C) | C (E) | D (A) | E (B) |
|-------|-------|-------|-------|-------|
| 0.75  | 7.25  | 8.75  | 6.75  | 5.25  |

2. Multiply:  $\begin{array}{r} 1507 \\ \times 58 \\ \hline \end{array}$

| A (B)  | B (C)  | C (A)   | D (E)  | E (D)  |
|--------|--------|---------|--------|--------|
| 87 006 | 88 306 | 150 758 | 87 406 | 86 406 |

3. Multiply:  $\begin{array}{r} 2.08 \\ \times 75 \\ \hline \end{array}$

| A (D) | B (C) | C (B) | D (E) | E (A) |
|-------|-------|-------|-------|-------|
| 24.96 | 1.56  | 156.0 | 186.0 | 560.0 |

4. Calculate:  $50 - 30 - 14 + 8 + 13 + 25 - 9$

| A (E) | B (C) | C (D) | D (B) | E (A) |
|-------|-------|-------|-------|-------|
| 43    | 47    | 53    | 34    | 38    |

5. Write 27 as a fraction of 36.

| A (B)         | B (A)          | C (D)         | D (E)         | E (C)         |
|---------------|----------------|---------------|---------------|---------------|
| $\frac{3}{4}$ | $1\frac{1}{3}$ | $\frac{1}{3}$ | $\frac{1}{4}$ | $\frac{1}{2}$ |

6. How many seconds are there in  $1\frac{3}{4}$  minutes?

| A (C) | B (E) | C (A) | D (B) | E (D) |
|-------|-------|-------|-------|-------|
| 95    | 175   | 105   | 150   | 42    |

7. Calculate:  $100 - 7 - 6 - 8 - 9 - 4 - 10 - 7 - 5 - 8$

| A (B) | B (A) | C (C) | D (E) | E (D) |
|-------|-------|-------|-------|-------|
| 38    | 46    | 36    | 35    | 37    |

8. Divide:  $25 \overline{) 436.00}$

|         |         |         |         |         |
|---------|---------|---------|---------|---------|
| A (A)   | B (B)   | C (C)   | D (E)   | E (D)   |
| R 18.00 | R 17.40 | R 17.04 | R 17.00 | R 17.44 |

9. What should be in the place of ....?

$\frac{7}{11}$  of 121 grams = .... grams

|       |                  |       |       |       |
|-------|------------------|-------|-------|-------|
| A (E) | B (B)            | C (D) | D (C) | E (A) |
| 84    | $190\frac{1}{7}$ | 44    | 11    | 77    |

10. Calculate:  $2\frac{3}{4} + 1\frac{7}{8} + \frac{1}{2}$

|                |                  |                |                |                |
|----------------|------------------|----------------|----------------|----------------|
| A (E)          | B (C)            | C (A)          | D (D)          | E (B)          |
| $4\frac{3}{8}$ | $3\frac{11}{14}$ | $4\frac{1}{8}$ | $5\frac{1}{8}$ | $4\frac{1}{2}$ |

11. Calculate:  $(3\text{ m } 5\text{ cm} \times 2) + (2\text{ m } 9\text{ cm} \times 2)$

|         |          |          |         |          |
|---------|----------|----------|---------|----------|
| A (B)   | B (A)    | C (D)    | D (E)   | E (C)    |
| 12m 8cm | 10m 28cm | 12m 80cm | 11m 2cm | 10m 14cm |

12. Calculate:  $3\frac{5}{9} + 5\frac{1}{3}$

|               |               |               |                |                |
|---------------|---------------|---------------|----------------|----------------|
| A (D)         | B (B)         | C (E)         | D (A)          | E (C)          |
| $\frac{1}{3}$ | $\frac{3}{5}$ | $\frac{2}{3}$ | $1\frac{1}{2}$ | $1\frac{2}{5}$ |

13. Calculate:  $2\frac{3}{5} + 4\frac{1}{4} + \frac{3}{10}$

|                 |                 |                 |                |                 |
|-----------------|-----------------|-----------------|----------------|-----------------|
| A (A)           | B (B)           | C (E)           | D (B)          | E (C)           |
| $6\frac{7}{20}$ | $7\frac{3}{20}$ | $6\frac{3}{10}$ | $7\frac{1}{4}$ | $6\frac{7}{19}$ |

14. Calculate:  $\frac{1}{4} + 0.25$

Give the answer as a common fraction.

|                |                |               |               |               |
|----------------|----------------|---------------|---------------|---------------|
| A (E)          | B (A)          | C (D)         | D (C)         | E (B)         |
| $2\frac{3}{4}$ | $1\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{1}{8}$ | $\frac{1}{4}$ |

15. Calculate:  $5\frac{1}{2} - 3\frac{1}{6}$

|                |                |                |                |                |
|----------------|----------------|----------------|----------------|----------------|
| A (E)          | B (D)          | C (C)          | D (B)          | E (A)          |
| $2\frac{1}{4}$ | $2\frac{2}{3}$ | $2\frac{1}{3}$ | $1\frac{1}{3}$ | $2\frac{1}{6}$ |

I6. What should be in place of ....?

A rectangular poultry pen is 6 metres long and 4 metres wide.

Its perimeter = .... metres.

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (A) | C (D) | D (C) | E (B) |
| 24    | 10    | 16    | 20    | 14    |

I7. Calculate:  $\frac{1}{5} + 0.3$

Give the answer as a decimal.

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (E) | C (D) | D (A) | E (B) |
| 0.8   | 2.3   | 0.35  | 0.32  | 0.5   |

I8. The area of a rectangle is  $30 \text{ cm}^2$ .  
Its length is 6 cm.

What is its width?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (B) | B (D) | C (E) | D (A) | E (C) |
| 50 cm | 12 cm | 5 cm  | 24 cm | 10 cm |

I9. How many times can 200 grams be taken from 5 kilograms?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (E) | A (C) | D (D) | E (B) |
| 25    | 1 000 | 40    | 50    | 250   |

20. Calculate:  $2 \frac{1}{10} \times 2 \frac{1}{7}$

|                 |                  |                  |                   |                 |
|-----------------|------------------|------------------|-------------------|-----------------|
| A (B)           | B (A)            | C (C)            | D (E)             | E (D)           |
| $4 \frac{1}{2}$ | $4 \frac{1}{70}$ | $4 \frac{2}{17}$ | $\frac{147}{150}$ | $\frac{1}{180}$ |

Test 2:

I. What is the value of G if  $\frac{G}{50} = \frac{80}{100}$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (E) | C (C) | D (A) | E (B) |
| 4     | 40    | 25    | 400   | 160   |

2. Look at the number 15.36

Write the value of the 3 in this number as a proper fraction.

|                |               |                 |               |                |
|----------------|---------------|-----------------|---------------|----------------|
| A (A)          | B (D)         | C (E)           | D (B)         | E (C)          |
| $\frac{10}{3}$ | $\frac{3}{1}$ | $\frac{3}{100}$ | $\frac{1}{3}$ | $\frac{3}{10}$ |

3.  $3 \times \dots \times 5 = 150$

What number should be in the place of ....?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (B) | B (A) | C (E) | D (D) | E (C) |
| 15    | 30    | 135   | 10    | 142   |

4. By what fraction must 170 be multiplied to get an answer of 17?

|                 |               |                |               |                  |
|-----------------|---------------|----------------|---------------|------------------|
| A (E)           | B (A)         | C (D)          | D (C)         | E (B)            |
| $\frac{1}{100}$ | $\frac{2}{5}$ | $\frac{1}{10}$ | $\frac{1}{5}$ | $\frac{1}{1000}$ |

5. N is a number that is greater than nought. Which of the following products is therefore greater than N?

|                 |                 |                  |                 |                 |
|-----------------|-----------------|------------------|-----------------|-----------------|
| A (D)           | B (B)           | C (C)            | D (A)           | E (E)           |
| $0.99 \times N$ | $0.75 \times N$ | $0.459 \times N$ | $1.25 \times N$ | $0.09 \times N$ |

6. I am thinking of a certain number. If the number is divided by 9, the answer is 40 remainder 4.

Of which number am I thinking?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (B) | B (A) | C (D) | D (E) | E (C) |
| 356   | 364   | 346   | 360   | 76    |

7. Which element of the set {5; 7; 9; 11; 13} should be in place of N in the following sentence?

$$N + 5\frac{1}{2} = 2$$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (D) | C (A) | D (B) | E (C) |
| 5     | 7     | 9     | 11    | 13    |

8. Which decimal number should be in the place of .... in the following addition sum?

$$\begin{array}{r} \dots \\ 0.57 \\ + 1.41 \\ \hline \end{array}$$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (A) | C (B) | D (E) | E (D) |
| 1.84  | 0.94  | 1.16  | 0.84  | 1.98  |

9. What should be in place of the .... to make the following sentence true?

$$\frac{I5}{....} = \frac{3}{5}$$

|       |       |       |       |                |
|-------|-------|-------|-------|----------------|
| A (D) | B (B) | C (E) | D (A) | E (C)          |
| 9     | I     | 25    | 20    | $\frac{I}{25}$ |

10. Which number should be in the place of ....?

$$.... \times \frac{I}{3} = 6$$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (E) | C (A) | D (C) | E (B) |
| I6    | I2    | 24    | I5    | I8    |

11. What should be in place of the ....?

$$0.05 \times .... = 0.5$$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (A) | B (C) | C (B) | D (E) | E (D) |
| I00   | I0    | 0.I   | 0.0I  | I.0   |

12. Look at this multiplication sum:

$$\begin{array}{r} 25 \\ \times 50 \\ \hline I\ 250 \end{array} \text{ answer}$$

What is the value of the 2 that has been carried in this sum?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (P) | C (C) | D (E) | E (A) |
| 20    | 2 000 | 200   | 2     | 0.2   |

13. Write the natural number 26 as a number with base 5.

|                     |                    |                     |                    |                    |
|---------------------|--------------------|---------------------|--------------------|--------------------|
| A (E)               | B (D)              | C (C)               | D (B)              | E (A)              |
| $IOI_{\text{five}}$ | $5I_{\text{five}}$ | $20I_{\text{five}}$ | $I3_{\text{five}}$ | $II_{\text{five}}$ |

14. Look at this number line. (All the marks on the number line are the same distance apart).



Which fraction should be in the place of the letter x?

|               |                |               |               |                |
|---------------|----------------|---------------|---------------|----------------|
| A (D)         | B (E)          | C (B)         | D (A)         | E (C)          |
| $\frac{I}{4}$ | $\frac{3}{IO}$ | $\frac{3}{8}$ | $\frac{3}{4}$ | $\frac{I}{I2}$ |

15. Which number should be in place of ...?  $... \times \frac{I}{2} = I4$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (B) | C (A) | D (E) | E (D) |
| 28    | 7     | I4    | I2    | I6    |

9. What should be in place of the .... to make the following sentence true?

$$\frac{15}{\dots} = \frac{3}{5}$$

|       |       |       |       |                |
|-------|-------|-------|-------|----------------|
| A (D) | B (B) | C (E) | D (A) | E (C)          |
| 9     | 1     | 25    | 20    | $\frac{1}{25}$ |

10. Which number should be in the place of ....?

$$\dots \times \frac{1}{3} = 6$$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (E) | C (A) | D (C) | E (B) |
| 16    | 12    | 24    | 15    | 18    |

11. What should be in place of the ....?

$$0.05 \times \dots = 0.5$$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (A) | B (C) | C (B) | D (E) | E (D) |
| 100   | 10    | 0.1   | 0.01  | 1.0   |

12. Look at this multiplication sum:

$$\begin{array}{r} 25 \\ \times 50 \\ \hline 1250 \end{array} \text{ answer}$$

What is the value of the 2 that has been carried in this sum?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (B) | C (C) | D (E) | E (A) |
| 20    | 2 000 | 200   | 2     | 0.2   |

13. Write the natural number 26 as a number with base 5.

|                     |                    |                     |                    |                    |
|---------------------|--------------------|---------------------|--------------------|--------------------|
| A (E)               | B (D)              | C (C)               | D (B)              | E (A)              |
| 101 <sub>five</sub> | 51 <sub>five</sub> | 201 <sub>five</sub> | 13 <sub>five</sub> | 11 <sub>five</sub> |

14. Look at this number line. (All the marks on the number line are the same distance apart).



Which fraction should be in the place of the letter x?

|               |                |               |               |                |
|---------------|----------------|---------------|---------------|----------------|
| A (D)         | B (E)          | C (B)         | D (A)         | E (C)          |
| $\frac{1}{4}$ | $\frac{3}{10}$ | $\frac{3}{8}$ | $\frac{3}{4}$ | $\frac{1}{12}$ |

15. Which number should be in place of ...?  $\dots \times \frac{1}{2} = 14$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (B) | C (A) | D (E) | E (D) |
| 28    | 7     | 14    | 12    | 16    |

I6. What should be in place of the ....?

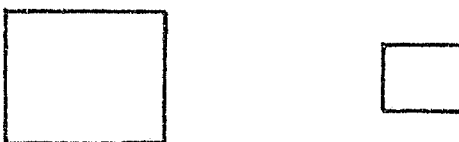
1.53 x .... kilograms = 153.0 kilograms.

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (E) | C (A) | D (B) | E (D) |
| 1 000 | 10    | 100   | 0.1   | 0.01  |

I7. Calculate:  $(3.5 \times 75) - (3.5 \times 74)$

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (B) | B (A) | C (C) | D (E) | E (D) |
| 7.0   | 3.5   | 35.0  | 262.5 | 1.0   |

I8. Look at the two squares that have been drawn here. Each side of the large square is 2 times as long as each side of the small square.



What should be in place of the .... in the following sentence?

The area of the large square is .... times the size of the area of the small square.

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (D) | C (E) | D (B) | E (A) |
| 2     | 4     | 8     | 6     | 16    |

I9. How many times can 0.1 be subtracted from 1?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (B) | B (A) | C (E) | D (C) | E (D) |
| 10    | 0.1   | 1     | 100   | 0     |

20. Three-quarters of Mr. MacDougall's age is 24 years. How old is he?

|         |         |         |         |         |
|---------|---------|---------|---------|---------|
| A (E)   | B (D)   | C (C)   | D (B)   | E (A)   |
| 18 yrs. | 30 yrs. | 36 yrs. | 32 yrs. | 42 yrs. |

Test 3:

I. Mrs. Mullins had R 24 in her purse. She then bought a hat for  $\frac{3}{8}$  of this money. How much did the hat cost?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (B) | B (C) | C (A) | D (E) | E (D) |
| R 64  | R 15  | R 18  | R 40  | R 9   |

2. Our square camp has a perimeter of 3 680 metres. How long is each side of the camp?

|        |       |       |       |         |
|--------|-------|-------|-------|---------|
| A (D)  | B (C) | C (B) | D (A) | E (E)   |
| 1 840m | 460m  | 920m  | 736m  | 14 720m |

3. When Mr. Thompson went to town his car's petrol tank was half full. The trip to town used up half of this petrol. Which fraction shows how full the petrol tank was then?

|       |               |               |               |               |
|-------|---------------|---------------|---------------|---------------|
| A (A) | B (D)         | C (E)         | D (B)         | E (C)         |
| 0     | $\frac{1}{4}$ | $\frac{1}{8}$ | $\frac{3}{4}$ | $\frac{3}{8}$ |

4. The mass of an empty steel drum is 22 kg. When half full of paraffin, the drum and the paraffin together, have a mass of 122 kg. What will the mass of the drum full of paraffin be?

|        |       |        |        |        |
|--------|-------|--------|--------|--------|
| A (C)  | B (D) | C (A)  | D (E)  | E (B)  |
| 100 kg | 22 kg | 222 kg | 122 kg | 200 kg |

5. Divide 3.5 litres of ginger beer equally among 7 children. How much does each one get?

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| A (C)  | B (E)  | C (A)  | D (D)  | E (B)  |
| 24.5   | 2      | 3.5    | 0.5    | 5      |
| litres | litres | litres | litres | litres |

6. Mother bought a piece of dress material. She used  $\frac{1}{3}$  of it. She still had 6 metres of the material left. How many metres of material did she buy?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (E) | C (D) | D (A) | E (B) |
| 2     | 4     | 10    | 8     | 9     |

7. Charles' mass is 3 times that of Peter's. Dad's mass is 4 times as much as Peter's. If Dad's mass is 80 kilograms, what is Charles' mass?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (C) | C (E) | D (A) | E (B) |
| 40 kg | 20 kg | 50 kg | 60 kg | 30 kg |

8. If Jafta walks  $2\frac{1}{2}$  kilometres every 20 minutes, how many kilometres will he walk in 1 hour?

|                |                |       |       |       |
|----------------|----------------|-------|-------|-------|
| A (C)          | B (B)          | C (A) | D (E) | E (D) |
| $7\frac{1}{2}$ | $6\frac{1}{2}$ | 10    | 5     | 9     |

9. There are four elements in a set of natural numbers.  
 The first element is 4.  
 The second element is 2 times as much as the first element.  
 The third element is 3 times as much as the second element.  
 The fourth element is 4 times as much as the third element.

What is the fourth element?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (C) | B (E) | C (D) | D (A) | E (B) |
| 24    | 96    | 13    | 192   | 36    |

10. A netball team played 16 matches.  
 The team won 0.75 of the matches, but lost the rest.

How many matches were lost?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (C) | C (E) | D (A) | E (B) |
| 12    | 6     | 8     | 4     | 9     |

11.  $\frac{2}{3}$  of the boys in standard 4 were Scouts.  
 There were 26 Scouts in standard 4.

How many boys were there in standard 4?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (C) | C (D) | D (B) | E (A) |
| 45    | 40    | 37    | 38    | 39    |

12. There were 38 litres of oil in a drum.  
 Then a can was filled 7 times with oil from the drum.  
 There were then still 3 litres of oil left in the drum.

How many litres of oil did the can hold?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (D) | C (A) | D (B) | E (C) |
| 7     | 5     | 4     | 6     | 8     |

13. Dad's rectangular fowl run is 35 metres long and 23 metres wide.

How many metres of netting-wire did he use to enclose the run?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (D) | C (C) | D (B) | E (A) |
| 116   | 58    | 805   | 1610  | 232   |

14.  $\frac{7}{10}$  of a piece of string is 7 metres long.  
 What is the total length of the string?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (D) | C (C) | D (A) | E (B) |
| 100 m | 50 m  | 10 m  | 70 m  | 49 m  |

- I5. Dianne baked a cake and cut it into two equal parts.  
Then she and her friend ate  $\frac{1}{2}$  of the one part.  
What part of the cake remained?

|               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|
| A (B)         | B (A)         | C (D)         | D (C)         | E (E)         |
| $\frac{3}{4}$ | $\frac{1}{2}$ | $\frac{5}{8}$ | $\frac{1}{4}$ | $\frac{3}{8}$ |

- I6. If you breathe once every 5 seconds while you sleep, how many times will you breathe if you sleep for 1 hour?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (E) | B (B) | C (D) | D (C) | E (A) |
| 288   | 72    | 12    | 720   | 144   |

- I7. Mona's mother bought  $\frac{3}{4}$  metre of dress material for R 2.25.  
Mona then bought  $\frac{1}{4}$  metre of the same material.  
How much did she have to pay for the  $\frac{1}{4}$  metre of material?

|       |       |                   |                   |       |
|-------|-------|-------------------|-------------------|-------|
| A (D) | B (C) | C (B)             | D (E)             | E (A) |
| 65c   | 75c   | $56\frac{1}{4}$ c | $55\frac{1}{2}$ c | 80c   |

- I8. Dora did a subtraction sum. Her answer was 5.6 but the correct answer was 4.85.  
How much more should she have subtracted?

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A (D) | B (B) | C (E) | D (A) | E (C) |
| 1.80  | 1.25  | 0.75  | 1.70  | 1.85  |

- I9. A man bought a pair of shorts and a shirt. The pair of shoes cost him R 11.00. He paid with two R 10.00 notes and received R 5.50 change.  
What did the shirt cost him?

|        |        |        |        |         |
|--------|--------|--------|--------|---------|
| A (C)  | B (E)  | C (A)  | D (D)  | E (B)   |
| R 4.50 | R 3.50 | R 2.50 | R 5.50 | R 14.50 |

20. If Mr. Smith requires  $2\frac{1}{2}$  litres of oil to fill the oil sump of his small car, how many times will he be able to fill the sump from a 25 litre drum of oil?

|       |                 |       |                 |       |
|-------|-----------------|-------|-----------------|-------|
| A (E) | B (C)           | C (B) | D (A)           | E (D) |
| 25    | $27\frac{1}{2}$ | 10    | $22\frac{1}{2}$ | 5     |

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