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## Perceived control and the management of information overload.

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PERCEIVED CONTROL AND THE MANAGEMENT OF INFORMATION OVERLOAD

A Thesis Presented

By

JUDAH CHARLES SAFIER

Submitted to the Graduate School of the  
University of Massachusetts in partial fulfillment  
of the requirements for the degree of

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Psychology Department

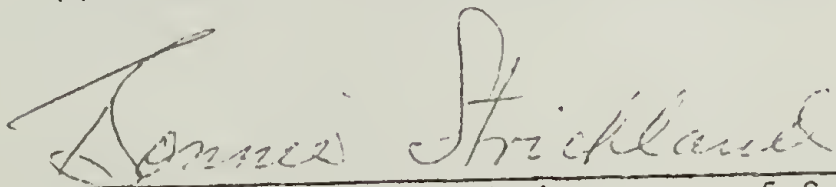
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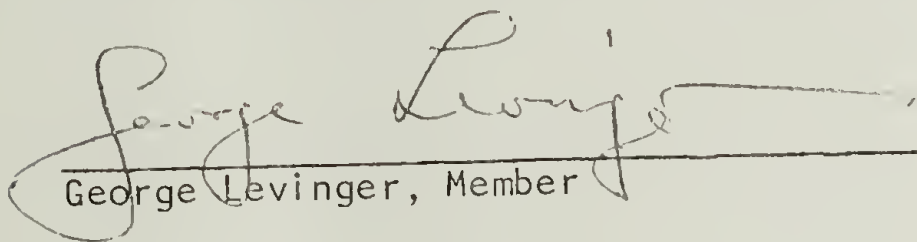
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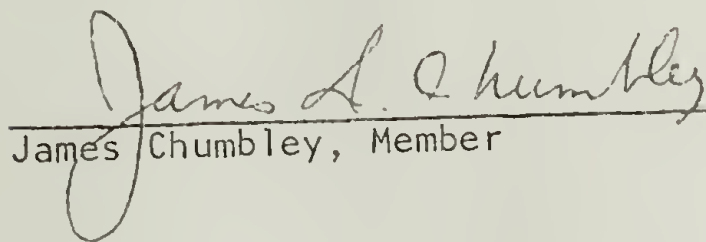
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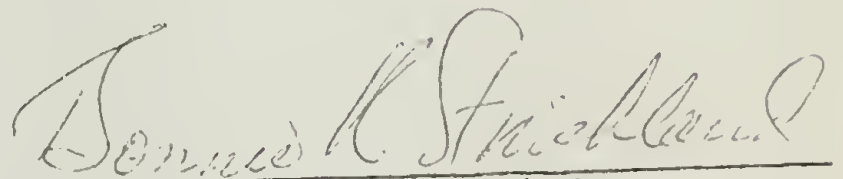
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## ABSTRACT

Strategies of coping with information overload were studied in an experimentally-induced overload situation. Forty undergraduate male volunteer subjects participated, and the responses they generated to cope with overload were broken down into five categories. The influences of perceived control and generalized expectancy for success on the development of these strategies were investigated. The results suggest that the efforts at control manifested in this experiment reflected subjects' generalized expectancies of control and mastery. A possible relation between reactions to experimental overload and the breakdown of the "filter" in schizophrenia is discussed.

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## CHAPTER I

### INTRODUCTION

The experience of being "swamped" with information is one which touches many aspects of daily life. Schedules and appointment notebooks are but one evidence of the demands competing for one's time and the need to adjust one's pattern of living to meet these demands. In the business world as well, executive decisions require an ability to keep up with ever-increasing amounts of information (French & Caplan, 1972). Urban life is similarly characterized by encounters with sensory and information overload (Milgram, 1970). This tendency is especially evident in technologically-advanced societies (Lipowski, 1975) and has been suggested to be a portent of the fate that awaits the modern person as s/he develops the syndrome popularly labeled "future shock" (Toffler, 1970).

The purpose of this study is to illustrate how individuals cope with an experimentally-induced overload situation and to determine if certain cognitive expectancies influence the response generated in that situation. It will be suggested that the process of strategy selection in response to overload is determined by the individual's sense that the incoming information can be controlled through one's expended efforts.

The study of the adaptations that must be made when confronted with such reality considerations arises out of a view of the individual as an information-processing organism. It is suggested (Miller, 1961) that each individual is capable of processing a limited number of informational units per given time. So long as a correspondence is maintained

between input and output, the demands made on the information-processing mechanisms may be met. "Overload" sets in when the channel capacity is exceeded by the level of stimulus input: i.e., there is more information coming in than can presently be processed. This may occur for a variety of reasons: level of input may be too high; there may be deficits in the individual's ability to process certain amounts or types of information; or relevant output may be unavailable to the individual. Whatever the specific dynamics, the result is that the input-output relationship cannot be maintained. In simplest terms, more information is coming in than the individual can deal with.

Before getting into the dynamics of overload, some discussion should be made concerning the strategies which an individual employs to keep up with information under normal conditions. Referring to the fractionation ("twigging") of knowledge and interest in technical fields, Weick (1970) discusses the process by which an individual balances the need for information with the capacity to absorb it. Weick suggests that the actor or scientist must continually make decisions as to the relevance of specific units of information within one's own scheme. One way this is done is by continual re-definition of the environment as to what information (qualitatively) and how much information (quantitatively) is necessary. The management of information input, then, depends on maintaining a flexible approach in order to keep pace with the constantly changing objects of inquiry.

The individual is seen as an actor who decides what to do with environmental input. Processing, then, is an active experience which depends on judgments the individual makes. Zajonc (1960) suggests that



the very types of cognitive structures the individual activates when receiving information depends on what one plans to do with it. Input-output correspondence is not engaged in a passive, automatic manner, but is an outgrowth of what plans the individual has made for the input.

What the actor's task comes down to may be seen as maintaining integrity in a world of flux. The actor (or Weick's scientist) is not trying to keep up with a stable entity as much as trying to remain as flexible as the world "out there" is while still pursuing a coherent line of inquiry or action. Because the world is so changing, a degree of ambiguity is very often unavoidable in the decisions made about informational input.

So long as that input is at tolerable levels (i.e., below one's channel capacity), the individual can continue making new decisions while still keeping track of old ones (Levinger & Spangenberg, 1976) and can modify the approach taken if changing requirements demand such an adaptation. Different strategies must be used, however, when information input increases beyond the organism's present capacity to process it. Decisions must be made as to the immediacy of certain kinds of information: what must be responded to at once and what can be held in abeyance. Strategies for coping with such overload reflect the subsequent costs that the organism is willing to assume in order to be able to restore maximally the current input-output correspondence. A breakdown in functioning may occur when this correspondence remains beyond the organism's capacity. It has been suggested (McReynolds, 1960) that schizophrenia is an example of such a breakdown, occurring in response to and as a result of the inability to restore the input-output corre-

spondence.

### Overload and Schizophrenia

Schizophrenia may be seen as a deficiency in the individual's ability to "filter" (Broadbent, 1971) incoming information, resulting in an ever-increasing magnitude of external stimulation. Epstein and Coleman (1970), in a review of a number of arousal theories of schizophrenia, suggest that a common assumption of these theories is "that a basic deficit in schizophrenia consists of a low threshold for disorganization under increasing stimulus input" (p. 136). The anxiety associated with schizophrenia may be a function of the level of unassimilated information the individual is carrying around (McReynolds, 1960). The ability to "make sense" of information by categorizing, assimilating, or rejecting it is lost, and in its stead there develops a susceptibility to all environmental input. Thus, reports of schizophrenic experiences refer to a heightened sensitivity to objects and stimulation (MacDonald, 1964, p. 181). One way to reduce this experience of bombardment is to withdraw completely from the world, thereby removing oneself from the realm of stimulation. It has in fact been shown that, following sensory deprivation, schizophrenic patients exhibited improved ego functioning and more adequate reality contact (Cooper, Adams, & Gibby, 1962). Petrie (1967) suggests a process of "defensive reduction" in schizophrenia to decrease the amount being perceived. The finding that reduced levels of stimulation lead to a reduction in schizophrenia-like behaviors may offer potential verification of the role of excessive levels of environmental input in the schizophrenic breakdown.

Some questions arise concerning the cause-effect relationship between overload and schizophrenia which, though they are beyond the scope of this study, have led to some interesting studies and findings. Is schizophrenia the result of a deficiency in one's filtering capacity or the cause of it? To what degree must the filter be weakened before the schizophrenic break occurs? Is treatment of schizophrenic symptoms simply a matter of supervised withdrawal from the world and gradual re-acclimatization to it? To a large extent, exploration of these questions has been undertaken by studying the reactions of normal subjects in schizophrenia-analogous situations.

Usdansky and Chapman (1960), using a conceptual sorting task, found that time-pressured normals showed impaired performance due to an increase in associative errors--a type of error found in schizophrenic thought and performance (Chapman, 1958). Time pressure is thus seen as a form of over-stimulation and stress, and, under such conditions, schizophrenia-like performance can be induced in normals. Using a modification of the Usdansky and Chapman paradigm, Grimes and McGhie (1973) found that the performance of normals under conditions of distraction stress was similar to that of schizophrenics under non-distraction conditions. Presumably, the overloading of the normal subjects with information led to the performance deficit characteristics of schizophrenic subjects and resulted from the necessity to process more information than could be handled. Most strikingly, Gottschalk, Haer, and Bates (1972) found a significant increase in schizophrenia-like activity and thought (social alienation, personality disorganization, and cognitive impairment) in normals who spent 43 minutes being bombarded by a



high-intensity "psychedelic" sound color movie. Uncontrolled sensory and informational stimulation, then, may overload the organism's processing capacity and be a factor in some forms of psychopathology.

### Strategies of Coping with Overload

Miller (1960, 1961) suggests various responses by which the individual attempts to adjust to information overload. He has identified seven responses: omission (temporary nonprocessing of information); error tolerance (processing incorrect information); queuing (delaying response to catch up during a lull); filtering (neglecting to process certain categories of information while processing others); approximation (responding with reduced precision); multiple channels (processing information through two or more parallel channels at the same time); and escape (terminating the flow of information) (Miller, 1960).

Miller's analysis has several shortcomings. There is no notion of any kind of sequence or flexibility of strategies; rather, they appear discrete and unconnected. This may relate to his view of overload as a definite point that is reached (Miller, 1961) rather than as a process within which the individual sifts information and makes decisions so as to reduce input to more manageable levels (Weick, 1970). The inference from Miller is that a single strategy is selected and adhered to, rather than several being used in conjunction. Seen in this context, "error" and "approximation" lose some of their distinctiveness, for both mechanisms entail giving an inexact response without "sharpening" it subsequently. Similarly, "omitting" and "filtering" both refer to not processing certain information with no mention made by Miller of how,

for example, "queuing" could be used to facilitate "filtering." Miller's strategies, as he presents them, appear to be too removed from real-world applicability to be useful in understanding overload. Viewing them in the context of Weick's process of overload brings them into more of an immediate realm.

As defined in the present study, mechanisms of dealing with overload by reducing the amount of incoming information may be grouped into three broad categories, which differ according to how information is dealt with. These categories do not take into account a situation where overload can be prevented by increasing the rate of processing, for then the individual is never in an overload situation. Rather, they represent the kinds of decisions the individual can make when overloaded with information in order to reduce input while maximizing performance. It should be noted that the category headings which follow are adapted from Miller, but have been made more specific with a view to operationalizing these mechanisms; e.g., Miller's "filtering" is operationalized by combining it with a "queuing" mechanism which allows for the retrieval of deferred information. Thus, though the terms "filtering," "omitting," and "escape" have been used by Miller, they have been re-defined to fit into a process of reducing information overload:

- a) filtering: systematic omission of certain categories of information according to a coherent scheme (this strategy is systematic in the sense that the information whose processing has been deferred can be retrieved);
- b) omitting: non-systematic omission--simply not processing cer-

tain information (which cannot be retrieved);

- c) escape: terminating the situation--this can be either outright (by leaving the situation) or indirect (by remaining in the situation but responding haphazardly).

These definitions differ from Miller's in that, as defined here, a clear distinction exists between "filtering" and "omitting." The difference revolves around whether the process allows for the retrieval of information whose processing has been deferred. [Because "filtering"--as conceived here--is systematic in that sense, the individual may make more efficient use of lull periods to catch up on the material that had been previously filtered out, for s/he can be precise as to what needs to be done. Implicit in this definition is the notion that a strategy is more efficient to the extent that it deals first with information that cannot be queued (e.g., a task whose presentation will not be repeated).]

The process of dealing with increasing levels of environmental input by attempting to adapt to the rate of input should follow this route: an individual will initially try to process all the information coming in. With the realization that one is lagging behind in one's ability to respond, the individual will begin filtering information, responding immediately to those bits that will not be repeated and queuing others to be dealt with later. The most effective strategy, as overload increases, would be simply to make the filter "tighter" by queuing more and more information, while always responding first to that information which cannot be queued. A less effective strategy would be to move from filtering to omitting information non-systematically. The



decrease in effectiveness will manifest itself by the individual's inability to make up that information which has been "missed." An even less effective strategy (whether selected from the start or arrived at via this process) is when one's tolerance for error becomes so great that responses are simply made haphazardly--either in a "hit-or-miss" attempt to keep up with input, or to subvert the demands being made of him/her. This, in turn, may be a higher level strategy than direct escape (by leaving the situation), although in the present study the reason for escape will be explored in a post-experimental interview (i.e., escape decided upon from a position of power is a different process from escape due to helplessness).

[Briefly, then, the continuous "tightening" of the filtering mechanism suggests that, under conditions of increasing environmental input, filtering will precede omitting, which precedes (or accompanies) error tolerance, which precedes escape.] As overload increases, the individual moves from a more effective (in terms of dealing with all the input) to a less effective strategy of response. (It should be noted that while escape might be effective in terms of protecting self-esteem, it does not fulfill the experimental requirements of the present study. Rather, it is a response arrived at when the needs of the subject achieve precedence over the demands of the experimenter. Therefore, though escape might be the most adaptive response under certain conditions, it represents a decision that one's need for self-preservation outweighs the benefits that might accrue from acceding to external demands.)

### Perceived Control and Overload

While a variety of individual differences may reflect an ability to cope with overload, a number of studies suggest that perceived control over information input may be the most significant factor. Petrie (1967) identified a cognitive style which she called "reducing"; a tendency to decrease and limit the amount of stimulation coming in. Sales (1971) found that "reducers" prefer novel and complex situations, possibly because the higher level of stimulation such situations offer allows them to undertake their preferred perceptual operation. Thus, individuals who are identified as "reducers" actually seek out increased levels of stimulation in order to be able to decrease those levels, which suggests a desire to exercise some sort of power to achieve control over the environment. In a similar vein, Glass, Snyder, and Hollis (1974) see time urgency (type-A behavior) as a coping style aimed at maintaining control and achieving power over potentially uncontrollable environmental events.

Pettigrew (1975), in a study of organizational consultants, also mentions the control of information as a power resource. Especially under conditions of uncertainty, an individual who collects, filters, and reformulates information is in a good position to facilitate organizational change.

That control of incoming information may be seen as a source of power suggests that overload may be attractive to some individuals for the opportunity it provides for the exercise of that power. Weick (1976) maintains that "overload is a sign that you're indispensable. Visible overload begets the perception of being powerful, central, a

step in every process." The individual who is overloaded is afforded continual opportunities to exercise power and, in turn, is attributed power for that exercise. Overload, then, can have both constructive and destructive effects.

French and Caplan (1972) distinguish between quantitative and qualitative overload, suggesting differentiable effects of amount and kind of information coming in. Their studies suggest that, while appearing busy or swamped is desirable, appearing incapable or "out of one's league" is not. Thus, college professors and white collar workers admit more to quantitative overload than to qualitative overload. Among college professors, achievement orientation correlated .42 with number of hours worked per week and .25 with quantitative overload: these individuals want to be swamped. Qualitative overload, on the other hand, was found to be related to low self-esteem. There is, then, a certain amount of prestige associated with appearing to be harried while actually maintaining control over the environment. To the extent that the individual can exert this control over environmental input, s/he should be able to withstand the detrimental effects of overload and possibly use the situation to increase his/her own self-esteem and/or social standing.

Internal versus external control of reinforcement. There may be at least three types of control associated with high levels of environmental input:

1. I am personally in control of the amount of information coming in.
2. I am not personally in control of all the information coming



in, but there are no negative consequences: either someone else will assume part of the load, or I will assume it at some definite future point (i.e., filtering with queuing).

3. I am not in control of the information, and there are negative consequences, because what I miss cannot be made up.

Beliefs about one's ability to control the environment or to be at its mercy relate to the ways in which an individual copes with environmental threat (Lazarus, 1966, p. 133). Rotter's (1966) internal-external (IE) construct differentiates between these perceptions of control by referring to the generalized belief about the connection between one's behavior and the reinforcements which follow it (Appendix C). As defined by Rotter (1966), internal control relates to the belief that environmental events (rewards and punishments) are contingent upon one's skills, attributes, or behaviors. External control refers to the belief that those events are beyond personal control, but are, rather, a factor of luck, chance, or a powerful other. The applications of the IE construct appear in a number of very thorough reviews (Lefcourt, 1966, 1972, 1976; Phares, 1976; Strickland, 1973, 1977). Some of the differences between internals and externals that appear in the literature will be mentioned here in terms of their relation to this study.

One of the ways in which internals aim to control their environment (Julian, Lichtman, & Ryckman, 1968) is by seeking out and utilizing information relevant to their situation (Seeman, 1963; Seeman & Evans, 1962). Internals characteristically engage the environment via greater attentiveness (Lefcourt & Wine, 1969) and longer deliberation in decision-making (Rotter & Mulry, 1965) in order to utilize that information

to cope better with the demands of reality (Phares, 1968). Internals, then, may be expected to act on their own behalfs to take steps that will facilitate their adaptation to situational demands.

In fact, both Seeman (1959) and Minton (1967) relate locus of control to an individual's feeling of personal power. It is suggested that internality is related to perceived power and externality to helplessness. The relationship between externality and psychopathology is well-documented (Cromwell, Rosenthal, Shakow, & Zahn, 1961; Shybut, 1968; Palmer, 1971; Smith, Pryer, & Distefano, 1971; Lottman & Dewolfe, 1972; Cash & Stack, 1973; Duke & Mullens, 1973; Levenson, 1973; Lefcourt, 1976; Strickland, 1977) and suggests that, in this study, perceived lack of control over situational demands could induce a schizophrenia-like shutting-down process (i.e., escape from the overload situation).

This study will attempt to show how perceived control relates to strategy-selection under conditions of information overload. As noted above, overload management can be achieved by exerting control over the incoming information by making decisions about the categories of input. It would be most in keeping with situational requirements to respond first to that information that cannot be made up and to delay response to information that can be queued. Such a strategy would allow the individual to satisfy situational requirements without forfeiting overall performance or self-esteem. This strategy, though, requires a perception of control over environmental input (i.e., internality). One who lacks such a perception, it is suggested, will be unable to establish control and would therefore be at the mercy of environmental stimulation (i.e., externality) were self-protective steps not taken. These

steps suggest the development of a strategy in which situational requirements are replaced with ones arising out of a need to restore self-esteem or self-integrity. Thus, the individual either responds haphazardly, irretrievably ignores certain aspects of the situation, or terminates the situation completely. In any case, the strategy selected is ineffective because there appears to be no way to re-establish control over the situation.

The first hypothesis, then, is as follows:

1. Internals will attempt to exert control over information (by responding to both slides and cards simultaneously or by filtering) significantly longer than will externals.

According to Rotter's social learning theory (Rotter, 1954), behavior potential is a function of an individual's expectancy of reinforcement (based on past reinforcement history) and the value assigned to that reinforcement. The second and third hypotheses relate to these two aspects of Rotter's theory as they may be illustrated in the present study.

Because the present experimental task requires the individual to keep up with increasing amounts of input, the experiment may tap some sort of competency strivings. Presumably, individuals who feel themselves to be more competent, based on their past history, should manifest that expectancy in this situation by attempts to keep abreast of the increasing input. Generally, studies (Feather, 1966; Feather & Saville, 1967) have relied on experimental manipulations of success or competence to investigate the effects of prior success on subsequent expectations of success. These studies have shown that expectancies for



success tend to increase after success and to decrease following failure. To measure an individual's generalized expectancy for success, Hale and Fibel (1976) constructed the Generalized Expectancy for Success Scale (Appendix D) which allows for the study of the effects of the success expectancies one brings to the experimental situation prior to any experimental manipulations. This scale was administered to all experimental participants in order to see whether an individual's generalized expectancy for success would be manifested in attempts to mastering this specific experimental situation. This reflects the second hypothesis:

2. Individuals with a high generalized expectancy for success will attempt to exert control significantly longer than individuals with a low generalized expectancy for success.

The appearance of goal-directed behavior within Rotter's theory is influenced by the preference the individual assigns to that particular goal or reinforcement: the greater the value assigned to the reinforcement, the higher the probability of behavior aimed at attaining that reinforcement (given that expectancy of reinforcement is constant). In the present study, the reinforcement value of the experimental task for each individual should affect the time s/he spends in behavior aimed at achieving the reinforcement resulting from mastery of the task. This leads to the third hypothesis:

3. The reinforcement value assigned to the task will correlate positively with the amount of time spent in control of the input.

## C H A P T E R   I I

## METHOD

Task

The method followed a two-task paradigm: a primary task consisting of single slide presentations which were not repeated and a secondary task to which the subject responded as time permitted. The primary task required the subject to respond to paragraphs projected on a screen, one at a time, by noting the number of numerals interspersed within each paragraph. Only the numerals 2-9 were used, to avoid confusion between the letter l and the number 1 and between the letter 0 and the number 0. The placement of the numerals within the paragraphs was randomized following the table of random numbers in Myers (1975). The paragraphs were adapted from the World Book Encyclopedia (1977) and were approximately 50-60 words in length.

The secondary task consisted of a type of discrimination similar to that of the primary task, but these paragraphs were presented on index cards which could be stacked if there was not enough time to respond to them between the successive slide presentations. As the experiment progressed, the rate of presentation was speeded up (i.e., inter-slide interval was reduced--see Appendix A) so that the primary task came to "demand" almost all of the subject's attention. Instructions stressed that the slides were the primary task and that, while both tasks demanded response, the secondary task should be responded to as time permitted. To further ensure the primacy of the slides, they were defined as "worth more" than the cards in the final score.

The subject was required to decide whether to stack the cards as they were presented in order to respond to them when the slides were concluded (filtering) or to discard the cards completely (omitting). The subject could also elect to discontinue the secondary task by shutting off the card machine. Further, the subject could terminate the experiment at any time.

While internality has been shown to be related to academic achievement (Crandall, Katovsky, & Crandall, 1965; McGhee & Crandall, 1968; Nowicki & Strickland, 1973) and could, therefore, have affected the subject's ability to read the material presented to him in the experimental task, it is suggested that the task described here required a scanning rather than a reading approach on the part of the subject. The demand on the subject was not to comprehend or even to read the material, but simply to pick out and note the digits scattered throughout the material. Different reading abilities, then, should not have affected the subject's ability to carry out the task demands. Hence, strategy selection directly reflected the subject's perceptions of control. A more conservative approach could follow Yeats' (1976) suggestion that, when intelligence is controlled, IE does not strongly predict proofreading performance. Toward this end, subjects' grade point averages and Scholastic Aptitude Test scores were collected in order to be able to bring this factor under experimental control.

### Subjects

Forty male volunteers were randomly selected from a pool of University of Massachusetts undergraduates who had volunteered when recruited



in their psychology courses. Only males were selected because of the greater availability of IE data for males. The subjects ranged in age from 18-33 and received one experimental credit for their participation. Each subject was tested individually.

### Procedure

When the subject entered the laboratory, he was greeted by a casually-dressed male caucasian clinical psychology graduate student in his mid-twenties. The subject was seated at a table seven feet in front of a movie screen. On the table were two pencils and a blank sheet of paper on which he was to note his slide responses. To his right were two timers attached to the card machine, a slide projector, and a sheet of paper containing spaces in which to note the card responses. Each card was numbered, so that each response could be entered in the appropriately numbered space. The sheet on which the slide responses were to be made was not numbered; rather, the subject received immediate verbal feedback as to the accuracy of his slide responses, in addition to writing down the responses.

Each subject signed an informed consent form (Appendix B) which also asked for his student number, age, grade point average, and Scholastic Aptitude Test verbal, quantitative, and total scores. He then filled out two questionnaires: Rotter's Social Reaction Inventory (Appendix C) and the Hale-Fibel Generalized Expectancy for Success Scale (Appendix D). The order of presentation of these questionnaires was counterbalanced for each subject. After the scales were completed, the subject read the following instructions:

This is a study of information processing: what people do with information. You see before you a screen and to your side a slide projector, a machine containing cards, and two timers. You will also notice a sheet of paper placed in front of you, a sheet at your side, and a pencil. When the experiment begins, slides of one paragraph length each will be projected on the screen. The digits 2 through 9 will be scattered throughout each paragraph. Simultaneously, cards will be presented one at a time by the machine to your side. Each card will also contain one paragraph with the digits 2 through 9 scattered throughout it. Please note on the appropriate sheet the number of numerals in each paragraph. That is: on the sheet before you, note how many numerals are on each slide, making your notations in columns from top to bottom. On the sheet to your side, note how many numerals are on each card, making each notation in the box whose number corresponds to the number in the top left-hand corner of the card. In addition, as you respond to the slides, say your answers as well, so that you may receive feedback on your accuracy. There is no need to announce your responses to the card.

Each slide will be presented only once. The cards to your side will be presented simultaneously with the slides and should be responded to, as time permits, between the consecutive slide presentations. After you respond to a card, discard it by placing it off to the side. If you run out of time between the slides and do not respond to all the cards which have been presented, the card tray will continue to fill up. You will notice that the tray is full when cards stack up either beyond the lip of the tray or on the ramp. When this happens, you must decide whe-

ther to respond to the cards later on (by removing all of them from the tray and placing them at the base of the card machine) or to disregard them completely (by removing all of them from the tray and placing them off to the side). Of course, you can prevent the tray from filling up by continuously responding to the cards. However, responses to the slides are "worth" more than responses to the cards, for the slides represent the primary task. Your score will reflect the accuracy of your responses, the number of items you respond to, and the time the experiment takes you. Therefore, you should try as much as possible to respond continuously to both the slides and the cards. Please remember, however, that the slides are primary. Hence, as the experiment progresses, you may continue responding to the cards as well as to the slides, put the cards off for later processing (which will leave less time for the other sections of the experiment), discard the cards, or discontinue their presentation by shutting off the timers connected to the card machine. You may terminate the experiment at any time by notifying me.

When you conclude the experiment, there will be a short questionnaire to complete regarding your experience of this experiment.

Please repeat these instructions to me so that I can be sure that they are clear to you. I will also answer any questions you have about the instructions.

Each subject repeated the instructions in his own words, so that his comprehension of them could be ascertained. He was then asked to note the reinforcement value the task had for him (Appendix E).



At this point, the experiment began. The subject was observed via a one-way mirror. In this way, his method of responding to the experimental task could be followed and strategy changes recorded. Because the card tray had to be emptied continually, a record of the choice of strategy made by the subject at each point--i.e., each time he emptied the tray--could be obtained. Filtering began when the subject first stacked cards; omitting began when the subject first discarded cards; shutting off the card machine (partial escape) was noted when the subject flipped the timers off; and full escape occurred when the subject asked that the experiment be terminated.

The maximum time the experiment could take was 23 minutes and 20 seconds, or 1400 seconds (Appendix A). The task, therefore, could be completed within the hour for which the subject had volunteered. As the experiment progressed, it will be noted, the level of input continuously increased. The subject was first required to process four units of information in 80 seconds, then four units in 70 seconds, etc., until by the last stage of the presentation he was required to process two units of information in ten seconds.

Each subject was scored on the number of slides he responded to incorrectly ("errors") as well as the length of time which he actively controlled the rate of input ("control time"). Control was defined as either responding to both slides and cards simultaneously or filtering. Omitting and/or escape, as suggested above, entail a measure of giving up on some portion of the environmental input and therefore reflect some loss of control.

Subjects who stacked cards discovered at the conclusion that they

were not required to remain and complete the stack by responding to those cards. Because the cards had been stacked with the intent of returning to them after the slides were completed, the expression of this intent sufficed for the purposes of the experiment. Hence, after the subject had responded to three or four of the stacked cards and indicated that he would continue responding to the rest, he was told that he need not continue with the stacked cards.

At the conclusion of the task, each subject filled out a questionnaire (Appendix F) about his experience of the experiment. He was then interviewed about his responses to the questionnaire in order to facilitate a fuller understanding of the subjective experience of overload. The subject was then de-briefed both verbally and via a standard form (Appendix G). When the experiment was satisfactorily explained, the subject was given his experimental credit and asked to sign a release for his SAT scores. (Unfortunately, the University's records office did not recognize this release, as the SAT scores were recorded along with other confidential information for which no release had been obtained. Consequently, the accuracy of these scores is based on each subject's recollection.)

### Apparatus

The materials which comprised the input were 54 slides and 104 cards. The slides were projected from a Kodak ektagraph slide projector (model B-2). The card-presenting machine was a modified Kodak ektagraph slide projector (model B-2) which was elevated on a wooden base and surrounded by a wooden collar. A slot was cut in the collar to allow each

card to drop down onto a ramp and slide into a holding tray. The lip of the tray allowed 4-5 cards to stack up; if the cards were not removed, subsequent cards would slide over the lip and in front of the subject, thereby reminding him to empty the tray and providing the experimenter with a continual record of the decision-making process being undertaken. Attached to the card machine were two Hunter timers which moved the card carousel forward at 10-second intervals. The slides and cards were presented according to the schedule presented in Appendix A.



## C H A P T E R   I I I

## RESULTS

The first part of this section will describe the criteria by which responses were divided into five strategy categories. The quantitative results will then be applied to the hypotheses and examined for other relevant findings.

In response to the experimental task, subjects employed five different strategies. The task was presented in such a format that at the outset there was sufficient time to respond to both the slides and the cards. As the rate of presentation increased, different strategies developed:

Strategy 1: filtering until the end of the experiment

Individuals employing this strategy let the cards they missed stack up until the slides were completed and then turned their attention to completing the stack of cards ( $n = 15$ ).

Strategy 2: filtering and omitting

This strategy entailed letting the cards stack up to a point beyond which any subsequent cards were discarded. The card-presenting machine, however, was not shut off ( $n = 9$ ).

Strategy 3: filtering, omitting, and shutting off the card machine

In this strategy, cards were stacked up to a point and subsequent cards were discarded until card presentation was halted completely by turning off the card machine ( $n = 4$ ).

Strategy 4: filtering and shutting off the card machine

In this strategy, cards were stacked up to a point, and the pre-

sentation of subsequent cards was prevented by immediately turning off the card machine (without the intermediate step of discarding cards) ( $n = 9$ ).

#### Strategy 5: escape

This strategy includes all individuals who elected to terminate the experiment before all the slides had been presented ( $n = 3$ ).

The means and standard deviations for each strategy group on each experimental variable are presented in Table 1.

-----  
Insert Table 1 about here  
-----

The hypotheses were investigated via correlation, multiple regression, and analysis of variance. The results of these tests will be presented as they come to bear on the hypotheses.

A correlation matrix was computed to ascertain the interrelations between the experimental variables. The matrix, which gives a general picture of these relationships, is presented in Table 2.

-----  
Insert Table 2 about here  
-----

The results of the correlations show trends in the direction of confirming Hypotheses 1 and 3. The negative correlation between locus of control and control time and the positive correlation between reinforcement value and control time are both in the predicted direction. While the significance levels do not meet the required .05, the directions of the relationships support the hypotheses. (A low IE score represents a belief in internal locus of control; hence, the negative correlational trend suggests a positive relation between internality and

TABLE 1

Means and Standard Deviations for Each Variable

According to Strategy

Strategy	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>Population</u>
IE <sup>c</sup>	9.33 <sup>a</sup> (3.94) <sup>b</sup>	10.11 (3.33)	10.00 (4.08)	11.00 (4.95)	13.00 (3.61)	10.23 (3.98)
GES <sup>d</sup>	98.93 (5.47)	97.77 (3.99)	96.25 (8.85)	96.33 (3.24)	102.67 (9.29)	98.10 (5.44)
RV <sup>e</sup>	3.67 (0.82)	3.56 (1.13)	3.50 (0.58)	3.56 (0.73)	2.67 (0.58)	3.53 (0.85)
GPA <sup>f</sup>	2.796 (0.33)	3.17 (0.53)	2.68 (0.26)	2.67 (0.34)	2.24 (1.13)	2.799 (0.503)
SATV <sup>g</sup>	529.67 (75.89)	484.44 (87.34)	490.00 (118.32)	500.56 (57.80)	505.67 (125.83)	507.25 (80.99)
SATQ <sup>h</sup>	522.67 (81.54)	553.33 (69.46)	567.50 (80.57)	573.89 (80.38)	536.67 (119.30)	546.63 (79.91)
SATT <sup>i</sup>	1052.33 (138.08)	1037.78 (140.69)	1057.50 (190.50)	1085.56 (145.16)	1043.33 (237.14)	1056.38 (145.60)
ERRORS <sup>j</sup>	24.13 (7.07)	27.67 (7.86)	26.00 (4.08)	20.67 (11.46)	12.67 (4.16)	23.47 (8.68)
CONTROL <sup>k</sup> TIME (in seconds)	1400. (0)	994.44 (216.46)	755.00 (285.95)	1138.89 (112.83)	610.00 (85.44)	1126.25 (294.75)

<sup>a</sup>mean<sup>b</sup>standard deviation<sup>c</sup>Score on Rotter IE scale (Appendix C)<sup>d</sup>Score on Hale-Fibel GES scale (Appendix D)<sup>e</sup>Reinforcement value<sup>f</sup>Grade point average<sup>g</sup>SAT-verbal<sup>h</sup>SAT-quantitative<sup>i</sup>SAT-total<sup>j</sup>Number of incorrect slide responses<sup>k</sup>Time in control of input



TABLE 2  
Pearson Correlation Coefficients\*

	IE	GES	RV	GPA	SATV	SATQ	SATT	ERRORS	CONTROL TIME
IE	1.0000 (0) s**=.001	.0025 (40) s=.494	-.0739 (40) s=.325	-.2184 (40) s=.088	-.0322 (40) s=.422	.3689 (40) s=.010	.1924 (40) s=.117	.1770 (40) s=.137	-.2085 (40) s=.098
GES		1.0000 (0) s=.001	-.1843 (40) s=.128	-.2803 (40) s=.040	-.0590 (40) s=.359	-.2511 (40) s=.059	-.1839 (40) s=.128	-.1406 (40) s=.193	.1437 (40) s=.188
RV			1.0000 (0) s=.001	.0957 (40) s=.278	.0235 (40) s=.443	.0666 (40) s=.341	.0595 (40) s=.358	.0419 (40) s=.399	.2166 (40) s=.090
GPA				1.0000 (0) s=.001	.2730 (40) s=.044	.1934 (40) s=.116	.2566 (40) s=.055	.4224 (40) s=.003	.1212 (40) s=.228
SATV					1.0000 (0) s=.001	.5365 (40) s=.001	.8622 (40) s=.001	.1924 (40) s=.117	.1634 (40) s=.157
SATQ						1.000 (0) s=.001	.8811 (40) s=.001	.3218 (40) s=.021	-.1212 (40) s=.228
SATT							1.0000 (0) s=.001	.2929 (40) s=.033	.0234 (40) s=.443
ERRORS								1.0000 (0) s=.001	.1606 (40) s=.161
CONTROL TIME									1.0000 (0) s=.001

\*one-tailed

\*\*significance level

exerting control over the information for some length of time. A high reinforcement value score indicates a feeling that the task is important, reflected by the time spent in control of the task.)

Hypothesis 2--the effect of GES on control time--was not confirmed at a significant level by the correlational results, although the results were in the predicted direction. However, a median split suggested that the effect might best be studied by a t-test. The population was divided at the median, with the 18 low-GES individuals whose mean control time was 1018 seconds being compared to the 22 high-GES individuals whose mean was 1215 seconds. The results indicate that this difference is significant ( $t = 2.21$ ,  $df = 38$ ,  $p < .05$ ), confirming Hypothesis 2 and illustrating the influence of GES on the amount of time spent in control of the input.

Significant positive correlations were found between errors and grade point average ( $r = .42$ ,  $p < .01$ ), Scholastic Aptitude Test-quantitative ( $r = .32$ ,  $p < .05$ ), and Scholastic Aptitude Test-total ( $r = .29$ ,  $p < .05$ ). Apparently, individuals who were superior on these measures made significantly more errors on the slides. Some relation exists, then, between academic achievement and number of errors made.

Generalized expectancy for success correlated negatively with grade point average, suggesting that individuals who do better scholastically do not generally expect to do well, and that individuals who do have a generalized expectancy for success do not do as well scholastically. Perhaps the academic achievement of the former group is to compensate for their generalized expectancy of non-success, while individuals in the latter group do not consider academic achievement to be a signifi-

cant factor in their world-view.

The effects of the other experimental variables on the dependent variables errors and control time were investigated by multiple regression. This analysis allows for the determination of the specific contributions of each variable to the criterion dependent variable.

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 Insert Table 3 about here  
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Grade point average and IE both contributed significantly to the error score, and were therefore the best predictors of errors in this study. (Because the SAT scores could not be verified, there might be some question as to their accuracy. It is likely that more subjects recalled their grade point averages accurately, as those were of more recent consequence than their SAT examinations, which subjects had taken up to several years prior to the experiment. Hence, the grade point averages were studied more extensively. However, because they too were based on recall, there was still a chance of dissimulation on the part of subjects. This suggests that the effects of grade point average and SAT should possibly be re-investigated under conditions where their accuracy can be based on more than personal recall.)

A t-test was used to determine the effect of IE on errors. A median split divided the population into 21 internals and 19 externals. The mean error score for the internals was 21.05 and for the externals 26.16. This difference was significant ( $t = 1.92$ ,  $df = 38$ ,  $p < .05$ ) using a directional test.

The multiple regression of the other variables on control time is presented in Table 4.



TABLE 3  
Multiple Regression of Variables on Errors

<u>Variable entered</u>	<u>F to enter</u>	<u>Significance</u>	<u>R square</u>	<u>Overall F</u>	<u>Significance</u>
GPA	8.25	.007	.178	8.25	.007
IE	3.78	.060	.255	6.32	.004
SATQ	.97	.331	.274	4.53	.009
GES	.03	.874	.274	3.31	.021

-----  
Insert Table 4 about here  
-----

Reinforcement value, IE, and GES all contributed to control time, although not dramatically. This result supports the three hypotheses of the study and is supported by the correlations and the finding, cited above, that high-GES individuals controlled the input significantly longer than did low-GES individuals.

To summarize the results mentioned so far: internality, high generalized expectancy for success, and a belief that the task was important all influenced in a positive direction the amount of time spent in control of the input. More errors were made by externals and by high academic achievers. These findings suggest that errors resulted from some sort of carelessness rather than from low reading ability or low academic achievement. Perhaps the combination of performance feedback and speed of presentation exacerbated the effects of overload by raising performance anxiety.

Because "strategy" was not a continuous variable, its effects could not be studied by multiple regression. Consequently, analyses of variance were computed for the effect of strategy on errors and on control time.

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Insert Table 5 about here  
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An effect of strategy on errors was found ( $p < .10$ ). To see if the effect was due simply to the extreme scores, a Duncan's multiple-range test was employed. This test compares all the group means and deter-

TABLE 4

Multiple Regression of Variables on Control Time

<u>Variable entered</u>	<u>F to enter</u>	<u>Significance</u>	<u>R square</u>	<u>Overall F</u>	<u>Significance</u>
RV	1.87	.179	.047	1.87	.179
IE	1.50	.228	.084	1.70	.197
GES	1.39	.246	.118	1.61	.204
SATV	1.09	.304	.145	1.48	.229
SATQ	.90	.349	.167	1.36	.263
GPA	.34	.562	.175	1.17	.346
SATT	.070	.795	.421	1.18	.338



TABLE 5  
Analysis of Variance Errors by Strategy

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>
Main effects				
Strategy	611.575	4	152.894	2.298*
Residual	2328.400	35	66.526	
Total	2939.975	39	75.384	

\*p < .10

mines which are significantly different from each other. All the means that are presented in a single subset are not significantly different from each other; two means are significantly different from each other only if they appear in separate subsets.

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 Insert Table 6 about here  
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The effect found was due to a comparison of the extreme error scores of Strategies 2 and 5 and may be explained by the reduced exposure of Strategy 5, for escape reduced the number of slides to which one was exposed.

The analysis of variance of strategy on control time is presented in Table 7.

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 Insert Table 7 about here  
 -----

A significant effect of strategy on control time was found ( $p < .01$ ). Duncan's multiple-range test was utilized to see if this effect was due simply to the extreme scores.

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 Insert Table 8 about here  
 -----

With the exception of Strategies 3 and 5, all other groups have mean control times which differ significantly from each other. This effect, then, is not due solely to the fact that individuals in Strategy 1 exerted control for the entire experiment. Interestingly, individuals in Strategy 4, who ultimately gave up, initially controlled for a significantly longer time than did individuals in Strategy 2.

The raw data (Table 1) suggested testing the effect of strategy on

TABLE 6

Duncan Multiple Range Test\* Errors by Strategy

Subset 1

	Strategy 5	Strategy 4	Strategy 1	Strategy 3
Group mean	12.6667	20.6667	24.1333	26.0000

Subset 2

	Strategy 4	Strategy 1	Strategy 3	Strategy 2
Group mean	20.6667	24.1333	26.0000	27.6667

\*p &lt; .05

TABLE 7  
Analysis of Variance Control Time by Strategy

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>
Main effects				
Strategy	2632726.389	4	658181.597	30.495*
Residual	755411.111	35	21583.175	
Total	3388137.500	39	86875.321	

\*p < .01



TABLE 8

Duncan Multiple Range Test\*

Control Time (in seconds) by Strategy

Subset 1

	Strategy 5	Strategy 3
Group mean	610.0000	755.0000

Subset 2

	Strategy 2
Group mean	994.4444

Subset 3

	Strategy 4
Group mean	1138.8889

Subset 4

	Strategy 1
Group mean	1400.0000

\*p &lt; .05

grade point average. The results are presented in Table 9.

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 Insert Table 9 about here  
 -----

A main effect of strategy on grade point average was found ( $p < .05$ ). Duncan's multiple-range test (Table 10) indicated that this effect was also due to the extreme groups.

-----  
 Insert Table 10 about here  
 -----

The mean grade point average of individuals who employed Strategy 2 is significantly different ( $p < .05$ ) from that of individuals who employed either Strategy 4 or Strategy 5. Apparently, the "smartest" individuals chose to follow the increasing pace of the experiment by moving from filtering to omitting without that resulting in a move to escape by shutting off the card machine.

The effects of GES on control time and of strategy on control time suggested the possibility of an interaction between them. Consequently, an analysis of variance was computed and is presented in Table 11.

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 Insert Table 11 about here  
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The two-way interaction of GES and strategy on control time was significant ( $p < .05$ ). Differences among the means were again determined by a Duncan's multiple-range test (Table 12).

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 Insert Table 12 about here  
 -----

Individuals with a low GES controlled for a significantly shorter time in Strategies 2 and 3 than did high-GES individuals employing those

TABLE 9  
Analysis of Variance  
Grade Point Average by Strategy

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>
Main effects				
Strategy	2.402	4	.601	2.813*
Residual	7.473	35	.214	
Total	9.875	39	.253	

\*p < .05

TABLE 10  
Duncan Multiple Range Test\*  
Grade Point Average by Strategy

Subset 1

	Strategy 5	Strategy 4	Strategy 3	Strategy 1
Group mean	2.2400	2.6733	2.6750	2.7960

Subset 2

	Strategy 3	Strategy 1	Strategy 2
Group mean	2.6750	2.7960	3.1733

\*p < .05



TABLE 11

## Analysis of Variance

Control Time by Generalized Expectancy for Success by Strategy

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>
Main effects				
GES	164739.015	1	164739.015	11.843*
Strategy	2412389.015	4	603097.254	43.357*
Two-way interactions				
GES by Strategy	173368.763	4	43342.191	3.116**
Residual	417303.333	30	13910.111	
Total	3388137.500	39	86875.321	

\*p &lt; .01

\*\*p &lt; .05

TABLE 12

Duncan Multiple Range Test\*

Control Time (in seconds) by Generalized Expectancy for Success by Strategy

Subset 1

	Low <sup>a</sup> GES-Strategy 3	High <sup>a</sup> GES-Strategy 5	Low GES-Strategy 5
Group mean	575.0000	605.0000	620.0000

Subset 2

	Low GES-Strategy 5	Low GES-Strategy 2
Group mean	620.0000	866.0000

Subset 3

	Low GES-Strategy 2	High GES-Strategy 3
Group mean	866.0000	935.0000

Subset 4

	High GES-Strategy 3	Low GES-Strategy 4
Group mean	935.0000	1103.3333

Subset 5

	Low GES-Strategy 4	High GES-Strategy 2	High GES-Strategy 4
Group mean	1103.3333	1155.0000	1210.0000

Subset 6

	Low GES-Strategy 1	High GES-Strategy 1
Group mean	1400.0000	1400.0000

<sup>a</sup>based on lower and upper halves of population.

\*p &lt; .05

strategies. This, then, is a behavioral measure of generalized expectancy for success, at least for these two strategies.

Finally, the effect of strategy on perceived experimental duration was studied by an analysis of variance.

-----  
Insert Table 13 about here  
-----

There was no significant effect of strategy selected on the response made to the first part of post-experimental question #3: "How long do you think you worked on this task?"

TABLE 13  
 Analysis of Variance  
 Perceived Experimental Duration by Strategy

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>
Main effects				
Strategy	465400.0000	4	116350.0000	.762*
Residual	5344640.0000	35	152704.0000	
Total	5810040.0000	39	148975.385	

\*p < .05



## C H A P T E R   I V

## DISCUSSION

Analysis of the Five Strategies

The most striking result is that subjects generated five different strategies to the same experimental situation. The task instructions were intentionally vague to allow for this result. The key phrase of the instructions, in this regard, is the sentence which describes how one's "score" will be computed. Upon reflection, the reader will notice a discrepancy in the components of the score: obviously, an increase in the number of items responded to will ipso facto increase one's time score. The instructions were worded in this way so as to allow each individual to read in the meaning which would be manifested in the approach he would take. Hence, some of the participants weighted the time score heavily, and took steps to keep that part of the total score down; others focused on responding to as many items as they could, regardless of the extra time this would entail. To further illustrate these distinctions, the post-experimental interviews were examined to understand the very different processes by which each individual responded to the experimental requirements.

Strategy 1: control

The fifteen individuals who filtered until the end of the experiment, stacking the cards they did not have time to respond to as the slides were presented, explained their behavior in terms of a definition of performance which stressed completing all aspects of the experiment. Each individual who used this strategy defined the best possible

score as one in which all items received a response. The increased time this response would take was not of major concern to them, for a variety of reasons. They sounded confident that completing the stacked cards would not dramatically increase their time scores, even though the average number of cards stacked by members of this group was approximately 70! (This number was computed by determining the average length of time individuals in this group did both tasks simultaneously and using Appendix A to determine the number of cards presented from that time until the conclusion of the experiment.) This fits well with the finding mentioned above that high-GES individuals controlled the input significantly longer than did low-GES individuals--apparently, confidence in one's abilities at effecting success was reflected behaviorally in the approach taken in this experiment. These individuals further felt that their accuracy in responding to the stack would be improved once the slides were no longer being presented, and that this increase in accuracy would outweigh any negative effects of their increased time score.

Another reason mentioned by Strategy 1 individuals for maintaining a filtering strategy is a desire to remain competitive with the challenge offered by the experiment. They were aware of pressure during the experiment, in that two tasks demanded response from them, but took the approach that they would not let the experiment "defeat" them. Rather, they accepted the challenge and instructed themselves, in the words of one member of this group, "Don't give up--don't let this thing get the better of you." In the words of another, "I just tried to keep my cool." They exerted some sort of control over the situation by telling themselves that the slides would eventually run out and then there would be

an opportunity to catch up on the stack. While this would increase the time spent in the experiment, in the words of a member of this strategy group, "What's important is not how quickly you do the job, but to do it well." As another put it, "A job worth doing is worth doing right." For this group, "doing right" meant achieving mastery and control by leaving no card unturned. They responded to the perceived challenge by adopting a strategy aimed at completing the job they felt the experiment demanded.

### Strategy 2: compromise

The nine individuals who adopted Strategy 2 moved from filtering to omitting at some point during the experiment, but did not shut off the card-presenting machine at any point. These individuals reported being caught in a bind. On the one hand, they were concerned about the effect on their time scores of remaining after the slides were completed to respond to a large stack of cards. They mentioned stacking the cards up to a point where they became concerned about the experiment taking too much time; at that point, they began omitting cards. On the other hand, shutting off the card machine would have meant giving up on the possibility that the slides would slow down, thereby allowing them to respond to the cards once again. Making the irrevocable decision to shut the machine "seemed like an easy out--a blow to the ego to admit I couldn't do it. It would have meant admitting failure." There were also post-hoc rationalizations justifying the correctness of this decision: "There was no way I could do both. I didn't think it was that important to keep reading the cards later on. I thought I did well enough, and what I did was okay." The objective behavior of individuals in this

group indicated some degree of giving up on a section of input; but to the people who selected this strategy, that decision did not imply giving up. Shutting off the machine carried that implication; omitting was felt to be a compromise between that portion of the score that demanded response to all input and that portion which advocated a conservative approach to the time element of the experiment.

Two interesting differences appear between Strategy 1 individuals and Strategy 2 individuals. The first group anticipated an end to the experiment, and stacked the cards in anticipation of that end. To them, the experiment apparently had a clear end-point, which the anticipated termination of the slide presentation would signal; once this first end-point was reached, full attention could be devoted to the stacked cards. When the stacked cards were completed, the experiment would be over. In contrast to that approach, individuals in Strategy 2 seemed to feel, based on the interview data, that the experiment was, in some ways, interminable or beyond their control. At best, they hoped for a slowing down of the rate of slide presentation, which would allow them to resume responding to the cards. They did not, however, anticipate being in control of the experiment past the point when the slides were finished. At that point, they felt, the experiment was over, and keeping at it by responding to extra cards would adversely affect their total score. At least to this extent, then, individuals who used Strategy 2 manifested some degree of overload: they felt so caught up in what was going on that they were unable to respond in ways that would return control of the experiment to them. When the end did come, it signalled relief from the input rather than, as it did to individuals in Strategy 1, an oppor-



tunity to continue working to improve one's score.

Along these lines, Strategy 2 individuals felt the time that the experiment would take to be more oppressive than did Strategy 1 individuals, and the performance of Strategy 2 individuals manifested this belief. They omitted so as not to exceed what they perceived to be the time limitations of the task; Strategy 1 individuals, on the other hand, decided that responding to all the input would make up for the increased time those responses would take. This difference in time perception, however, was not reflected in the responses given to question 3 of the post-experimental questionnaire. There were no significant differences among the strategy groups in terms of how long they felt they had worked on the task (Table 13). Apparently, time exerted pressure during the experiment and motivated some individuals to stop filtering and start omitting; but, once the task was completed, this pressure was relieved, and all individuals felt that they had worked roughly the same amount of time. (The composition of Group 5 seems to have confounded any significant effect that might have been obtained. Group 5 was composed of three people, two of whom felt they had worked 10 minutes and one who responded "20 minutes" to question 3. Because the number of people in this group was so small, the one deviant response apparently biased the mean and prevented the attainment of a significant effect.)

### Strategy 3: continuous tightening of the filter

The four individuals who utilized Strategy 3 followed the hypothesized "classic" pattern of response to overload. When the rate of presentation became too fast to allow simultaneous response to both slides and cards, they shifted to a filtering strategy. As the stack grew, so

did their concern about the extra time the experiment would take if they remained to respond to the stacked cards. This motivated a shift to omitting subsequent cards, in the interests of saving time. Where this group differed from Group 2, however, is that we now have, in Strategy group 3, the first overt behavioral signs of overload: shutting off the card machine. Omitting, it should be remembered, did not stop the cards from being presented; the people in this group mentioned the distracting and interfering effect the continuing card presentation had on their ability to attend to the slides. Shutting off the card machine, then, represented a decision to forfeit some input in order to ensure adequate performance on the rest.

The people who used Strategy 3 emphasized the stress the instructions had placed on the primary task, thereby justifying their forfeiture of the secondary task. They felt that only this kind of shutting-down could see them through the remainder of the experiment. This decision also helped alleviate the subjective feeling of overload: "I said to heck with them (the cards), because I glanced up and saw how many cards were left." Shutting off the card machine, in the words of another subject, really helped: "I was more relaxed near the end (of the experiment) because I didn't have to concentrate on the cards." Thus, this strategy represents the continuous controlled "tightening" of the filtering mechanism mentioned earlier, via successively more stringent reductions in the amount of input impinging on the individual.

#### Strategy 4: from control to overload

The most interesting feature of the performance of the nine individuals who selected Strategy 4 is that they had initially been in con-

trol of the experiment (keeping up with stimulus presentations via simultaneous processing and filtering) for an average of almost 19 minutes, placing them second only to Group 1 on this measure (Table 8). Why, then, did they give up so close to the end? The interviews suggest that, in Group 4, overload was more severe than in any previous group. Almost all the subjects in this group mentioned feeling that the presentation of the cards became very distracting, and that continued filtering would have meant falling even further behind (time-wise) than they had already. Thus, the intermediate step of omitting, found in Group 3, is missing. The cards assumed a negative connotation: "Everything was going too fast and I couldn't concentrate on the slides. There were too many cards and I couldn't be bothered with them." Another subject reported: "I felt I couldn't keep up with the pace they (the cards) were being dropped at." Even more extreme is this comment: "It was physically impossible (italics mine) to keep responding to the cards (when the slides came right after each other)." Thus, the decision to stop filtering was reached when feelings of overload became very powerful to these individuals. Because the intermediate step of omitting did not offer enough relief from the distracting effects of the cards, they moved immediately to shutting off the card machine. That the feeling of overload was very real to members of this group was manifested both objectively (in that they "gave up" an average of only four minutes from the end, and could see that only 24 cards were left) and subjectively (in their comments about the impossibility of continuing without forfeiting a portion of input).



Strategy 5: escape

Three individuals terminated the experiment before all the slides had been presented. Interestingly, they followed three different patterns preceding their escape. One moved from filtering to omitting to shutting off the card machine before deciding to terminate the experiment; one tried filtering and omitting to cut down successively on the amount of input before terminating; and the third moved directly from filtering to termination. Thus, within this group itself are illustrated the varying methods of attempting to assume control before the realization that the task was beyond one's present capacities. The post-experimental interviews with these individuals are eloquent in their descriptions of overload: "I was too frazzled to want to continue"; "The numbers just began to overwhelm me"; ". . .and those things (the cards) kept jumping at me. It seemed like there was too much to do. . .I was getting all jumbled up and missing a lot of stuff. I just got tired mentally of doing this stuff, so I figured I had enough." (Much care was taken in de-briefing these individuals and attempting to dissipate any stress the experiment had aroused.)

From the viewpoint of attempting to respond to all the experimental input, these five strategies represent successively less adaptive mechanisms of response. Strategy 1 individuals could make up the input they had missed, and exerted control to ensure that outcome. Strategy 2 individuals felt that, within the present structure, full response was impossible, but hoped that the structure might change to allow response. However, they gave up some of their own control by deciding that they could not work past the conclusion of the slides. In Strate-



gy 3 is the first appearance of an overload-motivated shutdown: one part of the input is irrevocably forfeited in the interests of another. Strategy 4 illustrates the disruptive effects of overload most clearly: giving up (by shutting off the card machine) when the end was very much within reach. Finally, Strategy 5 represents the clear decision to place one's requirements for self-protection or self-esteem ahead of externally-defined task requirements. Interestingly, from this perspective Strategy 5 is probably very adaptive: it does not get the job done, but perhaps sometimes throwing one's hands up is the only viable option that remains.

#### Quantitative Results

The negative correlational trend between externality and time in control (Table 2) and the finding that internals made significantly fewer errors than externals suggest that individuals who held internal expectancies manifested their sense of control in at least two ways in this experiment. They selected strategies that would allow them to remain "on top of" the input by responding carefully to the primary task without forfeiting the secondary task in the process. Thus, they satisfied two of the experimental requirements: they responded to many items and did so accurately. This type of control is similar to that mentioned by individuals who selected Strategy 1: the extra time the experiment would take was not as significant a factor as the feeling of having done the job and done it well. There appears to be, then, a very strong similarity between the decision-making processes of internals and the individuals who selected Strategy 1.

The behavioral manifestation of a high generalized expectancy for success is interesting. High-GES individuals controlled the input significantly longer than did low-GES individuals, reflecting attempts at gaining mastery. A past history of successful dealings with the environment, then, appears to be an important factor in one's current confidence in one's abilities to do the same in any situation.

There are some indications, however, that this type of control--disregarding the time factor in favor of increased volume of response and increased accuracy--might have been a gamble which the "smartest" individuals preferred not to take. The negative correlation between grade point average and generalized expectancy for success (Table 2) is one indication of this. Perhaps high-GES individuals controlled for as long as they did in order to compensate for some anxieties the task--given in an academic setting--aroused in them. Perhaps, as mentioned above, high-GES individuals do not consider academic achievement to be significant in their world-view, whereas low-GES individuals strive to do well academically to make up for their generalized expectancy of non-success. Studying hard in order to do well appears to the low-GES group to be a way of ensuring success in at least one area of their lives. Whatever the explanation, there is one more indication that the type of control represented by Strategy 1 was not selected by the "smartest" individuals. Table 10 illustrates that the group with the highest mean grade point average selected Strategy 2. The mean grade point average of that group is the highest of all five, and significantly higher ( $p < .05$ ) than the means of Groups 4 and 5. Apparently, there was something about Strategy 2 that made it attractive to subjects with

high grade point averages. Perhaps the compromise Strategy 2 represents was the feature that struck the people who utilized it. As mentioned above, filtering resulted in an increased time score, which threatened Strategy 2 subjects. Shutting off the machine implied complete forfeiture of a section of input--a step that was too drastic for these academic achievers. Omitting, though, allowed them to restrict the input in the interests of time and accuracy while keeping open the option of increasing the total number of items to which they would response (i.e., if the presentation rate slowed down). Thus, these individuals attempted to cover all the bases in a way which manifested less outright control than Strategy 1, but which was more in contact, from a conservative viewpoint, with all the elements of the experimentally-defined reality.

The positive correlational trend between reinforcement value and time in control (Table 2) serves as a good illustration of the behavioral manifestation of reinforcement value--i.e., the greater the importance the subject assigned to the task, the longer he controlled the input. Thus, the present study has illustrated the effect on behavior of both expectancy of reinforcement (as measured by GES) and reinforcement value mentioned in Rotter's functional theory of behavior.

The two-way interaction that is of interest is the effect of generalized expectancy for success and strategy on control time (Table 11). The results indicate that individuals who had a high GES and used Strategies 2 and 3 controlled the input significantly longer than individuals with a low GES who used those strategies. The effect of generalized expectancy for success on control time, then, is most pronounced



for these two strategies. This may be because Strategies 2 and 3 are the only ones which allowed for that kind of variability in control time. Strategies 1 and 4 both involved a significant amount of control over the input; Strategy 5 resulted from a loss of control. Only in Strategies 2 and 3 could the individual be both a part of (by filtering) and not a part of (by omitting and/or shutting the card machine) the experiment for relatively equal durations; in simpler terms, the individual truly could filter "as long as he wanted." (Obviously, every person could filter as long as he wanted. The thrust of the argument, though, is that Strategies 1 and 4 reflect a high control time independent of GES; conversely, Strategy 5 reflects a low control time independent of GES. Only in Strategies 2 and 3 could the effect of GES appear to a significant extent.) Hence, Strategies 2 and 3 were the only ones which allowed "space" for the effects of a high generalized expectancy for success to appear and significantly increase the control time score.

#### Responses to Overload and Implications for Psychopathology

Weick (1970, p. 68) defines overload as "the perceived inability to maintain a one-to-one relationship between input and output within a realizable future, given an existing repertoire of practices and desires." The present experiment has illustrated how that "perceived inability" can develop and has suggested some factors that contribute to differences in that perception. It has also illustrated how people modify their practices in order to re-establish some level of control over the input. This modification of practices--strategies--undertaken in order to keep up with the input results from the continuous defini-



tion and re-definition of the environment which Weick ascribes to the individual encountering a potentially overloading situation. An understanding of an individual's reaction to overload must therefore take into account both one's observable behavior as well as the scheme of which this behavior is a manifestation. The strategies discussed in this study reflect qualitatively different schemes--broadly, responding to all input versus responding to a portion of the input versus rejection of all input. The factors involved in the development of those different schemes are therefore significant for our understanding of the subjective feeling of overload.

The most important factor influencing one's response to the experimentally-induced overload discussed in this study is the type of control which the individual assumes over the informational environment. Internality reflects one kind of perceived control of reinforcement; a generalized expectancy for success, too, reflects control and a confidence in one's ability to achieve that control and mastery. The different strategies, however, reflected different judgments about the level of control that was attainable in the experimental situation. Moving through Strategies 1 through 5, each group showed successively greater effects of overload; each group moved more toward self-protection and showed less concern for the external demands which the experiment made of them. One effect of overload, then, can be the development of a sense of the potential danger to oneself of remaining in a situation which is bombarding one with more input than can be handled. The options open to this individual require the exertion of some sort of control, either by re-asserting oneself (as in Strategy 1) or by restricting the volume of in-

put (Strategies 2-5). The individual continuously monitors the effects of his/her behavior and maintains flexibility by being prepared further to modify the practices selected (i.e., change strategies) as time goes on. However, based on the findings of this study, it is suggested that once the decision is made to "submit" to the level of input (by restricting it), further modifications are aimed only at further restrictions of the input. The individual replaces a general scope of the situation with a narrow one whose purpose is self-maintenance at the expense of environmental demands. The progression suggested here is a kind of downhill slide whose final result can often be the type of escape exhibited in Strategy 5.

Of course, rescuing oneself is a highly adaptive act, unless that decision is made prematurely and from a position of relative weakness. One is reminded of the neurotic, who adheres to fixed ways of responding partly because of the risk entailed in experimentation with new modes of behavior. S/he is acting adaptively in the adequate fulfillment of the demands of life, but is unaware of the variety of options available for fuller functioning. Thus, the neurotic is being "saved" and protected, but is simultaneously being cut off from a wider variety of experiences and input. The neurosis develops, then, as an attempt to maintain integrity in a changing world by adhering to fixed, "safe" patterns of behavior. The "bombardment" of the world's ambiguity further strengthens the neurotic's adherence to these patterns.

In the schizophrenic, the process is more extreme. McReynolds (1960) speaks of a perceptualization deficit in schizophrenia wherein the schizophrenic experiences anxiety resulting from a high level of un-

assimilated input. He describes the schizophrenic break as "functional sensory deprivation" (p. 262): the level of input becomes so high that self-protection motivates a shutdown of the system and withdrawal from the world. This breakdown can also result in the development of a new (delusional) conceptual structure by which to organize the unassimilated inputs, the "looseness" of the structure facilitating such assimilation. But the first step is an avoidance of and withdrawal from the world in order to reduce the level of input to manageable levels.

The present study has attempted to illustrate what the breakdown of the filter and the resulting bombardment and overload might look like. A further parallel between the experiment and McReynold's explanation of schizophrenic withdrawal is in the bind presented to the individual. Bateson, Jackson, Haley, and Weakland (1956) implicate the "double bind" in the etiology of schizophrenia: the pre-schizophrenic child receives contradictory messages from a parent and is unable to comment on the contradiction. The child is in a no-win situation in that any action taken can have negative repercussions. The experimental subject was in a similar bind. Given the demands of the experiment, he had to perform at some level, such performance being implicit in his decision to participate. Any decision made about how to deal with the input affected the "score"--usually negatively, as a decision to increase one component of the score resulted in a decrease on another component of it. The subject could comment on this bind only by changing his strategy or by terminating the experiment, each of which would again have consequences for whatever performance measure was being utilized. The strategies reflected the steps taken to assume control over this

bind or to submit to it.

Thus, some subjects withstood overload while others gave up. In a similar vein, while many individuals feel the bombardments and stress of life, not all become schizophrenic. This study has illustrated what some of the significant factors might be in the development of a "life strategy" to enable one to withstand the potentially detrimental effects of overload. Central to this strategy is the notion of perceived control, manifested here by internality and a generalized expectancy for success. One's sense of being able to exert significant control over one's environment and modify it to one's advantage is a developmental task whose significance cannot be understated. A premature or incomplete resolution of that task might be a factor in the "surrender" of the schizophrenic.



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## APPENDIX A

## Presentation Schedule

S1*			C8	S7		S11		S16		C65	S35	C85	
S1			C9	S7			C21		C46		C66	S46	C86
	C1**		C9		C19		C32		C47	S23	C67	S37	C87
	C1	S4			C20		C33		C48		C68	S38	C88
	C2	S4	C10		C21	S12		S17	C49	S24	C69	S39	C89
	C2		C10	S8			C34		C50		C70	S40	C90
	C3		C11	S8			C35		C51	S25	C71	S41	C91
	C3		C11		C22		C36	S18	C52		C72	S42	C92
S2			C12		C23	S13			C53	S26	C73	S43	C93
S2			C12		C24		C37		C54		C74	S44	C94
	C4	S5		S9			C38	S19	C55	S27	C75	S45	C95
	C4	S5		S9			C39		C56		C76	S46	C96
	C5		C13		C25	S14			C57	S28	C77	S47	C97
	C5		C14		C26		C40	S20	C58		C78	S48	C98
	C6		C15		C27		C41		C59	S29	C79	S49	C99
	C6	S6		S10			C42		C60	S30	C80	S50	C100
S3		S6		S10		S15		S21	C61	S31	C81	S51	C101
S3	C7		C16		C28		C43		C62	S32	C82	S52	C102
	C7		C17		C29		C44		C63	S33	C83	S53	C103
	C8		C18		C30		C45	S22	C64	S34	C84	S54	C104

\*S=slide; hence, S1=first slide, S22=twenty-second slide, etc.

\*\*C=card; hence, C1=first card, C22=twenty-second slide, etc.

NOTE: Each entry on the schedule represents an exposure of 10 seconds. Hence, slide 5 was presented for 20 seconds, and slide 35 was presented for 10 seconds; card 5 was presented for 20 seconds, and card 35 was presented for 10 seconds. To summarize the presentation schedule:

<u>ON-duration</u> in seconds	<u>OFF-duration</u> in seconds	<u>Slides</u>
20	60	1-2
20	50	3-4
20	30	5-10
10	30	11-16
10	20	17-22
10	10	23-28
10	--	29-54

## APPENDIX B

## Informed Consent Form

I understand that the purpose of today's experiment is to study the way individuals process information. I realize that I may terminate the experiment at any time without penalty. I expect to receive a full description of the project and its implications as part of my participation.

I agree to participate in this study.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Student number

\_\_\_\_\_  
Age

GPA: \_\_\_\_\_

SAT: V \_\_\_\_\_ Q \_\_\_\_\_ Total \_\_\_\_\_



## APPENDIX C

## Social Reaction Inventory

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief: obviously there are no right or wrong answers.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. Find the number of the item on the answer sheet and black-in the space under the number 1 or 2 which you choose as the statement more true.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also try to respond to each item independently when making your choice; do not be influenced by your previous choices.

1. a. Children get into trouble because their parents punish them too much.  
b. The trouble with most children nowadays is that their parents are too easy with them.
2. a. Many of the unhappy things in people's lives are partly due to bad luck.  
b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.  
b. There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.  
b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
5. a. The idea that teachers are unfair to students is nonsense.  
b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
6. a. Without the right breaks one cannot be an effective leader.  
b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7.
  - a. No matter how hard you try some people just don't like you.
  - b. People who can't get others to like them don't understand how to get along with others.
8.
  - a. Heredity plays the major role in determining one's personality.
  - b. It is one's experiences in life which determine what they're like.
9.
  - a. I have often found that what is going to happen will happen.
  - b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
10.
  - a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
  - b. Many times exam questions tend to be so unrelated to course work that studying is really useless.
11.
  - a. Becoming a success is a matter of hard work, luck as little or nothing to do with it.
  - b. Getting a good job depends mainly on being in the right place at the right time.
12.
  - a. The average citizen can have an influence in government decisions.
  - b. This world is run by the few people in power, and there is not much the little guy can do about it.
13.
  - a. When I make plans, I am almost certain that I can make them work.
  - b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
14.
  - a. There are certain people who are just no good.
  - b. There is some good in everybody.
15.
  - a. In my case getting what I want has little or nothing to do with luck.
  - b. Many times we might just as well decide what to do by flipping a coin.
16.
  - a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
  - b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.
17.
  - a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
  - b. By taking an active part in political and social affairs the people can control world events.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.  
b. There really is no such thing as "luck."
19. a. One should always be willing to admit mistakes.  
b. It is usually best to cover up one's mistakes.
20. a. It is hard to know whether or not a person really likes you.  
b. How many friends you have depends upon how nice a person you are.
21. a. In the long run the bad things that happen to us are balanced by the good ones.  
b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
22. a. With enough effort we can wipe out political corruption.  
b. It is difficult for people to have much control over the things politicians do in office.
23. a. Sometimes I can't understand how teachers arrive at the grades they give.  
b. There is a direct connection between how hard I study and the grades I get.
24. a. A good leader expects people to decide for themselves what they should do.  
b. A good leader makes it clear to everybody what their jobs are.
25. a. Many times I feel that I have little influence over the things that happen to me.  
b. It is impossible for me to believe that chance or luck plays an important role in my life.
26. a. People are lonely because they don't try to be friendly.  
b. There's not much use in trying too hard to please people, if they like you, they like you.
27. a. There is too much emphasis on athletics in high school.  
b. Team sports are an excellent way to build character.
28. a. What happens to me is my own doing.  
b. Sometimes I feel that I don't have enough control over the direction my life is taking.
29. a. Most of the time I can't understand why politicians behave the way they do.  
b. In the long run the people are responsible for bad government on a national as well as on a local level.

NOTE: Score is number of underlined items.



## APPENDIX D

## Generalized Expectancy for Success Scale

This is a questionnaire to find out how people believe they will do in certain situations. Each item consists of a five-point scale and a belief statement regarding one's expectations about events. Please indicate the degree to which you believe the statement would apply to you personally by circling the appropriate number. Give the answer that you truly believe best applies to you and not what you would like to be true or think others would want to hear. Answer the items carefully, but do not spend too much time on any one item. Be sure to find an answer to every item, even if the statement describes a situation you presently do not expect to encounter. Answer as if you were going to be in each situation. Also try to respond to each item independently when making your choice; do not be influenced by your previous choices.

In the future I expect that I will. . .

1. . . .find that people don't seem to understand what I am trying to say.

highly							highly
improbable	1	2	3	4	5		probable

2. . . .be discouraged about my ability to gain the respect of others.

highly							highly
improbable	1	2	3	4	5		probable

3. . . .be a good parent.

highly							highly
improbable	1	2	3	4	5		probable

4. . . .be unable to accomplish my goals.

highly							highly
improbable	1	2	3	4	5		probable

5. . . .have a successful marital relationship.

highly							highly
improbable	1	2	3	4	5		probable

6. . . .deal poorly with emergency situations.

highly							highly
improbable	1	2	3	4	5		probable



7. . . .find my efforts to change situations I don't like are ineffective.

highly improbable	1	2	3	4	5	highly probable
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8. . . .not be very good at learning new skills.

highly improbable	1	2	3	4	5	highly probable
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9. . . .carry through my responsibilities successfully.

highly improbable	1	2	3	4	5	highly probable
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10. . . .discover that the good in life outweighs the bad.

highly improbable	1	2	3	4	5	highly probable
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11. . . .handle unexpected problems successfully.

highly improbable	1	2	3	4	5	highly probable
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12. . . .get the promotions I deserve.

highly improbable	1	2	3	4	5	highly probable
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13. . . .succeed in the projects I undertake.

highly improbable	1	2	3	4	5	highly probable
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14. . . .not make any significant contributions to society.

highly improbable	1	2	3	4	5	highly probable
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15. . . .discover that my life is not getting much better.

highly improbable	1	2	3	4	5	highly probable
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16. . . .be listened to when I speak.

highly improbable	1	2	3	4	5	highly probable
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17. . . .discover that my plans don't work out well.

highly							highly
improbable	1	2	3	4	5		probable

18. . . .find that no matter how hard I try, things just don't turn out the way I would like.

highly							highly
improbable	1	2	3	4	5		probable

19. . . .handle myself well in whatever situation I'm in.

highly							highly
improbable	1	2	3	4	5		probable

20. . . .be able to solve my own problems.

highly							highly
improbable	1	2	3	4	5		probable

21. . . .succeed at most things I try.

highly							highly
improbable	1	2	3	4	5		probable

22. . . .be successful in my endeavors in the long run.

highly							highly
improbable	1	2	3	4	5		probable

23. . . .be very successful working out my personal life.

highly							highly
improbable	1	2	3	4	5		probable

24. . . .experience many failures in my life.

highly							highly
improbable	1	2	3	4	5		probable

25. . . .make a good impression on people I meet for the first time.

highly							highly
improbable	1	2	3	4	5		probable

26. . . .attain the career goals I have set for myself.

highly							highly
improbable	1	2	3	4	5		probable

27. . . .have difficulty dealing with my superiors.

highly							highly
improbable	1	2	3	4	5		probable

28. . . .have problems working with others.

highly							highly
improbable	1	2	3	4	5		probable

29. . . .be a good judge of what it takes to get ahead.

highly							highly
improbable	1	2	3	4	5		probable

30. . . .achieve recognition in my profession.

highly							highly
improbable	1	2	3	4	5		probable

APPENDIX E

Reinforcement Value Scale

How important is it for you to do well on this task?

not important	1	2	3	4	5	very important
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## APPENDIX F

## Post-Experimental Questionnaire

1. What do you think was the purpose of this experiment?
2. How would you describe the process by which you dealt with the simultaneous slide and card presentations?
3. How long do you think you worked on this task?
  - a) Did you change your procedure in any way while doing so? If so, how? When? Please be as detailed as possible.
4. Why did you decide to terminate
  - a) the presentation of the cards; and/or
  - b) the experimentwhen you did?
5. Do you think there was any deception in this experiment?

## APPENDIX G

## Standard Feedback Form

Thank you for your participation. As you probably noticed, the rate of slide presentation kept increasing, making it more and more difficult to respond to both the slides and the cards. The aim of the study is to determine the strategies used in dealing with such a situation and how they relate to an individual's perception of personal vs. environmental control. We expect that the way an individual tries to control information will reflect his generalized perception of personal vs. environmental control. Your GPA and SAT scores were needed as an experimental control measure.

If you have any questions, I will be glad to answer them. Thank you once again for your participation.

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Name





