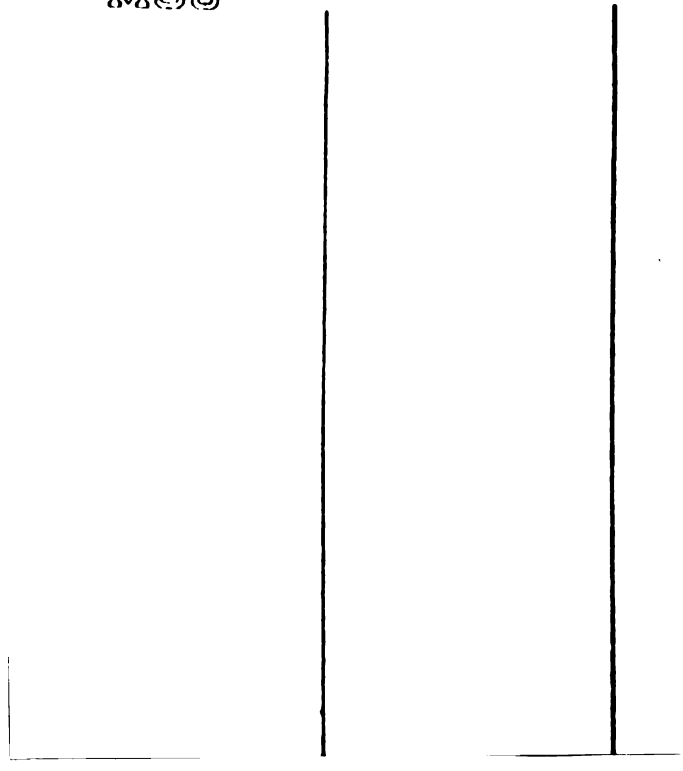

SOME DETERMINANTS OF THE FORMATION AND MODIFICATION OF NEW BELIEF SYSTEMS

by

Alfred Oram

A THESIS

Submitted to the School of Sciences and Arts of
Michigan State University of Agriculture and
Applied Science in partial fulfillment of
the requirements for the degree of

MASTER OF ARTS

Department of Psychology

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AN ABSTRACT

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Approved Milton Rokeach

This study was an experimental and theoretical analysis attempting to differentiate "party-line" and "genuine" thought processes. The theoretical position was derived from Rokeach's belief-thought model with the greatest emphasis being placed upon his analysis of what he terms the "fitting-filing process." New information given to an individual takes on the psychological form of a new belief or disbelief. Communication with other beliefs in the system is dependent upon the degree of isolation among such beliefs. The "party-line" (non-integrative) change is therefore, one in which a great deal of isolation exists among beliefs; whereas, the "genuine" (integrative) change is one in which their exists a high state of intercommunication.

The experiment was directed towards obtaining a measure of either the presence or absence of this hypothesized isolation of beliefs in the process of solving in sequence two specially designed problems. Both problems involved the integration of three beliefs in order to reach the solution; and, furthermore, two of the beliefs to be integrated were identical in both problems. An individual attempting to solve a problem in the second position, therefore, needed to integrate only one new belief if a "genuine" integrative change had occurred in the first problem. By the use of a counterbalanced design any savings in time required to integrate the beliefs was measured.

The problem-solving sequences were studied under two experimental conditions: (a) an Immediate Card Condition, in which all the new beliefs were presented on cards immediately at the start of the experiment, and

(b) a Spaced Card Condition, in which the beliefs were presented individually at predetermined time intervals.

Eighty subjects were selected by the use of Form E of the Rokeach Dogmatism Scale such that forty were high in dogmatism and forty were low in dogmatism. Ten subjects were tested in each of the eight possible experimental conditions.

Under an Immediate Card Condition, where presumably there was insufficient time for conflicts to develop between old and new beliefs, both high and low dogmatic groups exhibited a distinct savings in integration time for a problem given in the second position of the practice order. This savings in integration time was equated with the theoretical assumption of a high state of intercommunication among beliefs, therefore, indicating that a genuine change had occurred in the first problem.

Under a Spaced Card Condition, where time was available for conflicts to develop between old and new beliefs, low dogmatic individuals again manifested a distinct savings in integration time for a problem in the second position. However, high dogmatic individuals, those with closed systems of thought, under a Spaced Card Condition did <u>not</u> show a significant decrease in integration time. This lack of savings was equated with the idea that highly dogmatic individuals, under a Spaced Card Condition, do not manifest a "genuine" change in the first problem, but in reality exemplify what has been labeled as "party-line," non-integrative thinking.

INTRODUCTION

This study was designed to obtain some insight into the phenomenon popularly labeled "party-line" thinking. Furthermore, it is also an extension of the experimental work that has been previously conducted at Michigan State University upon the belief-thought model of Dr. Milton Rokeach (2,3,5,6).

The first study by Rokeach, McGovney, and Denny (3) was an attempt to distinguish between the two basic constructs of rigidity and dogmatism. Dogmatism, as it is utilized by Rokeach, refers to (a) a relatively closed cognitive organization of beliefs and disbeliefs about reality, (b) organized around a central set of beliefs about absolute authority which, in turn, (c) provide a framework for patterns of intolerance and qualified tolerance toward others (2). Rigidity is distinguished from dogmatism by its conception as a lower-order and less complexly organized form of resistance to change. Although rigidity, like dogmatism, refers to a resistance to change, it is a resistance to change of single ideas, beliefs, sets, or expectancies; whereas dogmatism refers to a resistance to change of systems of ideas, beliefs, sets, or expectancies.

Testing of the hypothesized distinction between rigidity and dogmatism was accomplished by the utilization of a special problem devised by M. Ray Denny. Specifically, this problem involves the invention of a new system of reality incorporating two necessary conditions for experimentally

contrasting the concepts of rigidity and dogmatism: (a) the rules of this fictional world are in contradiction to those one would expect from everyday living, and (b) the formulation of these rules necessitates their being integrated into a system exhibiting a high degree of intercommunication in order for the problem to be solved.

Due to the fact that an individual attempting to function adequately in this new world would have to overcome not only the specific sets, but also integrate them into a meaningful system, two types of measures were obtained: (1) a rigidity measure --- number of sets (beliefs) overcome within given periods of time, and (2) a dogmatism measure --- the time taken to solve the problem following the overcoming of the specific sets.

Results of the experiment were in the anticipated direction. High and Low Rigid Groups, as chosen by the Gough-Sanford Rigidity Scale (1), did but the High and Low Dogmatic Groups, as chosen by the Dogmatism Scale (4), did not differ significantly from each other on the number of sets (beliefs) overcome in the specified time intervals of the first ten and fifteen minutes. In regards to the time taken to solve the problem after the second set was overcome, the High and Low Dogmatic Groups did but the High and Low Rigid Groups did not differ significantly from each other.

The second study in the series was conducted by Vidulich (6) and was directed towards answering the question "... what it is about the cognitive process of the highly dogmatic individual which leads him to have difficulty in integrating new beliefs into a new system." It was

theorized that the highly dogmatic individual has more difficulty in the integration process than individuals low in dogmatism because the highly dogmatic individual is "... unwilling to accept or entertain new systems of thinking and reject old systems of thinking." The essential premise of this position revolves around the concept of selective forgetting. Highly dogmatic individuals in attempting to alter or reject the problem situation fail to remember the hints and the integration process is necessarily impaired.

All subjects were given the Doodlebug Problem which this time involved modifications designed to facilitate the integration process. The three new beliefs were typed upon separate 3X5 cards in the form of hints. Upon the overcoming of a belief by a subject, the appropriate card was placed before him; failure to overcome a belief in a given specified time interval was compensated for by placing the appropriate card in the individual's visual field. The High and Low Dogmatic Groups were subdivided into two experimental groups; (1) Keep Card Condition --- individuals permitted to retain the cards in front of them throughout the remaining time needed to gain the appropriate solution, and (2) Take Card Away Condition --- individuals that had the cards taken away from them as soon as they had time to read the card.

The Vidulich study substantiated the earlier conclusions that High Dogmatic Groups require a significantly longer period of time to solve the problem after the beliefs have been overcome but do not differ from the Low Dogmatic Groups in regards to speed of overcoming individual beliefs.

Moreover, individuals allowed to keep the beliefs integrated the beliefs consistently faster than individuals from whom the beliefs were taken away with the High Dogmatic Group profiting most by the experimental assistance. Measures of both immediate and delayed recall further substantiated the underlying theoretical position that the highly dogmatic individual's difficulty in integration is the result of his really not having the new beliefs at his finger tips. A questionnaire measure devised to tap the degree of acceptance of the problem and the beliefs, indicated a significantly higher rejection of the entire problem situation by individuals scoring high on the Dogmatism Scale.

The underlying assumption of Rokeach's belief-thought model is that all cognitive systems are organized into two interdependent parts, a belief-system and a disbelief-system (2). This intervening variable was designed to unite the organization of thought with belief.

> The belief system is conceived to represent <u>all</u> the sets, or expectancies, or hypotheses a person may have at any given time which he accepts as true, to one degree or another. The disbelief system is conceived to be composed of a series of disbelief sub-systems rather than just a single one within which are represented all the sets, expectancies or hypotheses which a person at any given time <u>accepts</u> as false, to one degree or another.

The belief-disbelief system is conceived as possessing additional properties by which it may vary in addition to the specific beliefs or disbeliefs held by a particular individual at any given time. A summary of these properties are presented in Rokeach's paper, <u>The Unity of Thought and Belief</u>, and are essentially as follows: (1) <u>isolation</u> - the degree of communication or interconnectedness between and within belief and disbelief

systems, (2) differentiation - the varying degrees of discrepancy in the degree of differentiation of the belief system as compared with the disbelief system, and among the several disbelief sub-systems with respect to each other, and (3) comprehensiveness or narrowness of the system - the total number of disbelief sub-systems represented in a given belief-disbelief system.

Furthermore, there is an important theoretical conceptualization of an organization along a central-peripheral dimension. Rokeach distinguishes between three sets of belief-regions corresponding to the theorized central-peripheral dimension: (1) central region - representing an individual's "primitive" beliefs which have to do with all the beliefs an individual has developed through interpersonal experiences rather than through formal indoctrination about the nature of the world one lives in, the nature of the "self" and the "generalized" other, (2) intermediate region - the beliefs a person has in and about the nature of authority depended on to form a picture of the world he lives in, and (3) peripheral region - the beliefs perceived to emanate from authority which fill in the details of this world picture.

According to Rokeach,

> It is the structural interrelations among central, intermediate, and peripheral beliefs and disbeliefs, rather than solely logical consistency, which gives the total belief-disbelief system its holistic or systematic character. All information impinging upon the person from the outside must be processed or coded in such a way so that the information is rejected or else fitted somehow in this system. It is this processing-coding activity which we call thinking, and surely it must be within some sort of a context like the belief-disbelief system that thinking takes place.

The processing-coding operation is hypothesized as involving the following steps: (a) an initial screening which may result in a rejection or narrowing out of new information taking place in the central region due to an incompatibility of new information with the primitive beliefs, (b) assimilation of new information into the belief-disbelief system that could necessitate the alteration-rationalization of the new information by finding out what one's authority sources have to say about it --- occurs in the intermediate belief region, and (c) the fitting-filing of this information into what ever world outlook one may have as his own --- occurs in the peripheral belief region.

The present study was derived from Rokeach's analysis of this fitting-filing process,

> The new information is communicated from the intermediate (authority) region to the peripheral region not in the form of information but in the psychological form of a new belief or disbelief. This belief -- new or modified -- may or may not communicate with other beliefs in the system, depending upon the degree of isolation among such beliefs. The greater the isolation the less effect will a change in one part of the peripheral region have upon adjacent parts, and vice versa. It is essentially in this way that one can differentiate conceptually a "party-line" change from a more "genuine" change.

Since the primary factor differentiating between a "party-line" and a "genuine" change is the hypothesized isolation of beliefs; the experimental design was specifically directed towards obtaining a measure of either the presence or absence of this isolation in the process of solving the Doodle-bug Problem. The possibility of measuring a phenomena as elusive as this was derived from a theoretical analysis of what effect this isolation of beliefs would have upon subsequent problem solving tasks.

Vidulich's study (6) suggests that individuals who are highly dogmatic do not possess as satisfactory a working knowledge of the individual beliefs as do individuals low in dogmatism. If his findings are correct, one may logically infer that highly dogmatic individuals attempting to solve a similar Doodlebug task would not receive as great a facilitative effect as individuals low in dogmatism. This impoverished transfer would be indicative of the absence of a "genuine" change in the first problem. The existence or non-existence of the hypothesized isolation of beliefs was therefore considered to be amenable to experimental manipulation and measurement by studying the transfer effects within a series of similar problem solving tasks specifically designed to induce positive transfer. Since the original Doodlebug Problem requires the overcoming and integration of multiple sets, is of sufficient difficulty to permit experimentation upon how this solution is accomplished, and is amenable to subsequent tampering; it was considered to be the logical starting point for devising a series of highly related problems.

The two cognitive tasks utilized in the present study were as follows:

PROBLEM #1

THE CONDITIONS:

Joe Doodlebug is a strange sort of imaginary bug. He can and cannot do the following things:

1. He can jump in only four different directions; north, south, east, and west. He cannot jump diagonally (e.g., southeast, northwest, etc.).

2. Once he starts in any direction, that is north, south, east, or west, he must jump four times in that same direction before he can switch to another direction.

3. He can only jump, not crawl, fly, or walk.

4. He can jump very large distances or very small distances, but not less than one inch per jump.

5. Joe cannot turn around.

THE SITUATION:

Joe has been jumping all over the place getting some exercise when his master places a pile of food three feet directly west of him. Joe notices that the pile of food is a little larger than he. As soon as Joe sees all this food he stops dead is his tracks facing north. After all his exercise Joe is very hungry and wants to get to the food as quickly as he possibly can. Joe examines the situation and then says, "Darn it, I'll have to jump four times to get the food."

THE PROBLEM:

Joe Doodlebug was a smart bug and he was dead right in his conclusion. Why do you suppose Joe Doodlebug had to take four jumps, no more and no less, to reach the food?

The correct solution to the problem is that Joe had already jumped once to the east when his master presented the food; therefore, he had to make three more jumps to the east and one jump back to the west landing on top of the food. As was previously stated, this solution is not an easy one for the average subject. The difficuly lies in the fact that an individual must not only overcome three beliefs contrary to his every-day thinking, but must then proceed to integrate these three new beliefs into a new system of reality.

PROBLEM #2

THE CONDITIONS:

Joe Doodlebug is a strange sort of imaginary bug. He can and cannot do the following things:

1. He can jump in only four different directions; north, south, east, and west. He cannot jump diagonally (e.g., southeast, northwest, etc.).

2. Once he starts in any direction, that is north, south, east, or west, he must jump four times in that same direction before he can switch to another direction.

3. He can only jump, not crawl, fly or walk.

4. He can jump very large distances or very small distances, but not less than one inch per jump.

5. Joe cannot turn around.

THE SITUATION:

Joe has been jumping all over the place getting some exercise when his master places a pile of food three feet directly west of him. Joe notices that the pile of food is a little larger than he. As soon as Joe sees all this food he stops dead in his tracks facing north. After all his exercise Joe is very hungry and wants to get to the food as quickly as he possibly can. Joe examines the situation noticing that there is a low canopy over the food, then says, "Darn it, I'll have to jump four times to get the food."

THE PROBLEM:

Joe Doodlebug was a smart bug and he was dead right in his conclusion. Why do you suppose Joe Doodlebug had to take four jumps, no more and no less, to reach the food?

Inspection of the two Doodlebug Problems readily illustrates how the revision of the original problem was accomplished. In the first problem Joe did not have to face the food in order to eat it, he could land directly on top of the food. The revised problem is identical to the original problem with the exception that this time there is a canopy over the food. Thus Joe Doodlebug can no longer eat the food by landing directly on top of the food. He must take an additional jump backward of the canopy landing slightly to the south of the food. He is now in position to eat. In other words, the set of not having to face the food

in order to eat it that was applicable in the original problem is no longer a "true" belief. The subject in solving this problem is forced to work with a belief directly opposed to one that has clearly worked earlier. However, it is also important to note at this time that only one of the three beliefs necessary for the solution of the first problem has been changed; the remaining two beliefs being identical in both problems.

The correct solution to this revised Doodlebug Problem is that Joe had already taken one jump to the west and therefore had to take three more jumps to the west, his last jump putting him on top of the canopy. At this point he is free to make a change in direction and jumps backward once to the south landing facing the food.

In subsequent discussions throughout the remainder of this paper the original Doodlebug Problem will be referred to as the No-canopy Problem and the revised problem will be referred to as the Canopy Problem. The modification of the experimental procedure which had been inaugurated in the Vidulich experiment (6) was retained throughout this study. The three new beliefs --- the facing, direction, and movement sets --- for each problem were typed on 3X5 cards.

EXPERIMENT #1

SUBJECTS AND PROCEDURE:

Six hundred and twenty-five students enrolled in an introductory psychology course at Michigan State University during the winter term of 1956 were given, under classroom conditions, a questionnaire composed of the forty items comprising Form E of the Rokeach Dogmatism Scale (4) plus a number of filler items interspersed among the dogmatism items.[1] Forty experimental subjects were selected from this original population; twenty on the basis of extremely high scores and twenty on the basis of extremely low scores. The range utilized for high dogmatic subjects was 188 to 234 with a mean dogmatism score of 197.2. Low dogmatic subjects ranged from a score of 60 to 119 with a mean score of 104.8.

Subjects taking the Dogmatism Scale are required to select one of six possible responses for each item. These six responses for each item (+3 to - 3, with no neurtal response permitted) were then converted into scores by the following method: (+3 equals 7 points, +2 equals 6 points, etc., down to -3 equals 1 point). Total scores on the scale, therefore, could range from a score of 40 points (low dogmatism extreme) to a score of 280 points (high dogmatism extreme).

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1 Form E of the Dogmatism Scale was reported by Rokeach to have a corrected reliability of .81 for the English College II sample and a reliability of .78 for the English Worker sample (4). The Vidulich study (6) gives a corrected reliability of .78 which is comparable to the previously cited reliabilities of Rokeach.

The following is a list of the forty dogmatism items included in the questionnaire with the instructions given to the original population of students:

The following is a study of what the general public thinks and feels about a number of important social and personal questions. The best answer to each statement below is <u>your personal opinion.</u> We have tried to cover many different and opposing points of view; you may find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others, and perhaps uncertain about others; whether you agree or disagree with any statement, you can be sure that many other people feel the same as you do.

Mark each statement in the left margin according to how much you agree or disagree with it. Please mark every one. Write +1, +2, +3, or −1, −2, −3, depending on how you feel in each case.

+1:	I AGREE A LITTLE	−1:	I DISAGREE A LITTLE
+2:	I AGREE ON THE WHOLE	−2:	I DISAGREE ON THE WHOLE
+3:	I AGREE VERY MUCH	−3:	I DISAGREE VERY MUCH

1. A person who thinks primarily of his own happiness is beneath contempt.

2. The main thing in life is for a person to want to do something important.

3. In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.

4. Most people just don't know what's good for them.

5. In times like these, a person must be pretty selfish if he considers his own happiness primarily.

6. A man who does not believe in some great cause has not really lived.

7. I'd like it if I should find someone who would tell me how to solve my personal problems.

8. Of all the different philosophies which have existed in this world there is probably only one which is correct.

9. It is when a person devotes himself to an ideal or cause that his life becomes meaningful.

10. In this complicated world of ours the only way we can know what is going on is to rely upon leaders or experts who can be trusted.

11. There are a number of persons I have come to hate because of the things they stand for.

12. There is so much to be done and so little time to do it in.

13. It is better to be a dead hero than a live coward.

14. A group which tolerates too much difference of opinion among its own members cannot exist for long.

15. It is only natural that a person should have a much better acquaintance with ideas he believes in than with ideas he opposes.

16. While I don't like to admit this even to myself, I sometimes have the ambition to become a great man, like Einstein, or Beethoven, or Shakespeare.

17. Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary at times to restrict the freedom of certain political groups.

18. If a man is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all."

19. Most people just don't give a "damn" about others.

20. A person who gets enthusiastic about a number of causes is likely to be a pretty "wishy-washy" sort of person.

21. To compromise with our political opponents is dangerous because it usually leads to the betrayal of our own side.

22. If given the chance I would do something that would be of great benefit to the world.

23. In times like these it is often necessary to be more on guard against ideas put out by certain people or groups in one's own camp than by those in the opposing camp.

24. In a heated discussion I generally become so absorbed in what I am going to say that I forget to listen to what the others are saying.

25. Once I get wound up in a heated discussion I just can't stop.

26. There are two kinds of people in this world: those who are on the side of truth and those who are against it.

27. Man on his own is a helpless and miserable creature.

28. The United States and Russia have just about nothing in common.

29. In the history of mankind there have probably been just a handful of really great thinkers.

30. The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.

31. The present is all too often full of unhappiness. It is the future that counts.

32. Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what is going on.

33. Fundamentally, the world we live in is a pretty lonely place.

34. It is often desirable to reserve judgment about what's going on until one has had a chance to hear the opinions of those one respects.

35. The worst crime a person can commit is to attack publicly the people who believe in the same thing he does.

36. In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own.

37. Most of the ideas which get published nowadays aren't worth the paper they are printed on.

38. It is only natural for a person to be rather fearful of the future.

39. My blood boils whenever a person stubbornly refuses to admit he's wrong.

40. When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.

Subjects were assigned to the various experimental conditions by a process of random selection. This selection was performed by a fellow graduate student in order to insure against any possibility of bias upon the part of the experimenter, since he would consequently not know the dogmatism score for any particular individual. All subjects were notified

that they had been chosen by a process of random selection involving the entire introductory psychology course. Subjects were then requested to appear for individual experimentation with each session requiring approximately one and one-half hours.

The experimental design utilized in this part of the study was as follows:

GROUP	N		COUNTERBALANCED PRACTICE ORDER	
	MALE	FEMALE	PROBLEM A	PROBLEM B
High Dogmatic	5	5		
Low Dogmatic	4	6	No-Canopy	Canopy
High Dogmatic	5	5		
Low Dogmatic	6	4	Canopy	No-Canopy

Subjects were tested upon an individual basis by A. Oram and J. Laffey. Timing was accomplished by the use of a stop watch calibrated for seconds. All subjects were verbally given the following standardized instructions which were typed on the Experimenter's instruction sheet. As the subject was seated the Experimenter read:

> Today you are going to be given two parts of a newly devised test of general intelligence. Arrangements for taking the final part of the test will be made following this testing period. In order to obtain an accurate measure of your ability it is necessary that you complete all three parts of the test. The problems are not simple ones but the solutions can be reached by good logical analysis. Here is the first problem. Read it over carefully.

At this time the Experimenter placed the problem in front of the subject. The No-Canopy and Canopy problems were typed upon beige and light blue paper, respectively and were mounted within a clear acetate cover.

The purpose of this was to help subjects differentiate between the two problems. As soon as the subject indicated that he had read the problem the Experimenter said:

> I'd like to ask you to think out loud as you work the problem so I can let you know whether you are correct or not. You may ask questions as you go along and you may refer to the problem at any time. You may use the scratch paper in any way you wish. Now let's read the problem over together.

The Experimenter proceeded to read the problem out loud to the subject while the subject followed in the reading. Following this the Experimenter gave the hints to the subjects stating:

> Here are some hints to help you solve the problem.

The three beliefs, in the form of hints, were then placed upon the table to the left side of the problem (hints were typed upon 3X5 cards identical in color to the problem sheet and placed within individual acetate folders of identical size to the cards). The Experimenter then told the subject to "begin."

The total time permitted for the solution of the problem was forty-five minutes.[2] When a subject successfully solved the problem, or at the end of forty-five minutes, he was given some magazines with instructions to read the magazine for a few minutes while the Experimenter made arrangements for the second problem. After five minutes had elapsed the Experimenter asked:

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2 The time limit of forty-five minutes was predetermined by the performance of four individuals in a pilot study which indicated that a time limit smaller than this would eventuate in an undesireable number of unsolved problems.

> What was the solution you gave to the problem about Joe Doodlebug?

The subject was then asked:

> What were the hints that I gave you on the typed cards?

Following this the Experimenter said:

> Here is the second problem about Joe Doodlebug. Read it over carefully.

When the subject had finished reading the problem the Experimenter stated:

> I'd like to ask you to again think out loud as you work the problem so I can let you know whether or not you are correct. You may ask questions as you go along and you may refer to the problem at any time. You may use the scratch paper in any way you wish. Now let's read the problem over together.

At this time the Experimenter read the problem to the subject and upon finishing this, he said:

> Here are some hints to help you solve the problem.

Again the three hints were placed upon the table to the left side of the problem sheet. Also, the Experimenter placed the first problem and its hints upon the table stating:

> Here is the first problem and hints. You may use them in anyway you feel will be of help to you.

Following the solution of this problem, or at the end of forty-five minutes if the problem was not solved, the Experimenter again asked the subject to read in a magazine. After a five minute period the Experimenter asked the same questions utilized following the first problem in order to test for recall of beliefs. The subject was then thanked for his cooperation and requested to refrain from discussing the problem with any of his

friends since it was possible that they would also be tested upon it in a few days. Furthermore, arrangements for the second testing session were made at this time.[3]

The specific hypotheses that were tested by the use of the two cognitive tasks were as follows:

A. Individuals high in dogmatism should require more time to solve the problems than individuals low in dogmatism.

B. Individuals high in dogmatism should not, but individuals low in dogmatism should, exhibit a facilitative effect when a problem appears in the second position of the counterbalanced practice order.

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3 The second testing session was not part of this thesis but was a continued study of the problem solving behavior of these same subjects. This work will be presented in a proposed thesis by J. Laffey. Mr. Laffey and this author shared equally the task of testing one-half of the subjects in both theses with each author testing five subjects in each of the possible experimental blocks of subjects.

RESULTS:

The statistical analysis of the data was accomplished by the use of the rank test for the significance of the difference between two groups as described by White (7). A normal curve approximation involving corrections for continuity and for ties in scores was used throughout the study.

Table 1 presents the mean solution times for high and low dogmatic groups on the Canopy and No-Canopy problems when these problems are given in the first position of the practice order. It is readily apparent that the 18.65 minutes required by the high dogmatic group on the No-Canopy problem is for all practical purposes identical to the 20.13 minutes required by the low dogmatic group. Likewise, the solution times of 24.76 minutes and 25.43 minutes on the Canopy problem, for the high and low dogmatic groups respectively, indicates a similar lack of significant differences.

The findings presented in Table 2 affords additional negative evidence of experimental differences between high and low dogmatic individuals. For both the No-Canopy and Canopy problems the expected differences not only failed to materialize (.24 level of significance) but the low dogmatic groups required longer periods of time for the problem solutions than the high dogmatic groups.

Hypothesis A, which states that individuals high in dogmatism should require more time to solve the problems than individuals low in dogmatism, cannot be upheld in view of the experimental data. At this point in the

TABLE 1

COMPARISON BETWEEN HIGH AND LOW DOGMATIC GROUPS ON THE TOTAL TIME TAKEN TO SOLVE THE NO-CANOPY AND CANOPY PROBLEMS IN THE FIRST POSITION OF THE PRACTICE ORDER

Problem	Group	N	Mean Time*	z	p
No-Canopy	High Dogmatic	10	18.65		
	Low Dogmatic	10	20.13	0.34	0.73
Canopy	High Dogmatic	10	24.76		
	Low Dogmatic	10	25.43	0.11	0.91

*The mean times are presented on this and subsequent tables for comparison purposes only, they do not enter into the computation of the rank-order statistic utilized.

TABLE 2

COMPARISON BETWEEN HIGH AND LOW DOGMATIC GROUPS ON THE TOTAL TIME TAKEN TO SOLVE THE NO-CANOPY AND CANOPY PROBLEMS IN THE SECOND POSITION OF THE PRACTICE ORDER

Problem	Group	N	Mean Time	z	p
No-Canopy	High Dogmatic	10	4.10		
	Low Dogmatic	10	5.30	1.17	0.24
Canopy	High Dogmatic	10	15.82		
	Low Dogmatic	10	21.18	1.17	0.24

research it was found that what had been originally designed to investigate "party-line" versus "genuine" type thought processes had paradoxically not only failed to answer the original question posed, but had in addition suggested many new and challenging ones. The implications of these findings were extremely important and definitely required at least some tentative answers.

Typical of the questions that had to be analyzed were: (a) Do these findings represent a failure to replicate the differences between high and low dogmatic subjects reported in the Rokeach, McGovney, and Denny (3) and Vidulich (6) studies? (b) Can the failure to obtain the postulated differences be attributed to an Experimenter factor indicative of faulty Experimenter techniques? (c) Is the theorized differences between high and low dogmatic individuals in regards to "party-line" and "genuine" types of problem solving correct?

The decisions that were reached about these questions were as follows: (a) The findings could not represent a failure to replicate the differences evidenced in the earlier studies due to the fact that the experimental designs are themselves different as will be evident shortly. (b) The findings are not indicative of an Experimenter variable since the subjects were tested by two independent Experimenters and their findings were essentially identical. (c) The theorized distinction between "party-line" and "genuine" type thought processes was predicated upon the existence of different integration times between high and low dogmatic groups being manifested on the first problem and therefore had not been adequately tested.

Implicit in the original theorizing and experimental design was the assumption that attempts at solving the problems would result in the interaction of conflicting beliefs. The three hints, or beliefs, given to the subjects on the cards were anticipated to operate in an antagonistic manner with the beliefs the individual would bring into the problem situation from his own experiences in the past. Highly dogmatic individuals, according to theoretical assumptions, would experience more difficulty in integrating these novel beliefs which were necessary for the problem solution which would eventuate in the desired result of an increased solution time for high dogmatic groups.

However, in retrospect it occurred to the writer that the problem situation is presented in such a way that it does not permit a fair test of the hypothesis regarding "party-line" thinking. It will be remembered that all three new beliefs were presented to the subject at the very beginning of the experiment. Consequently, we have unwittingly deprived the subject of the need, or opportunity, to bring these new beliefs into communication or conflict with the corresponding three older beliefs which are in contradiction to the new beliefs. If this is really the case, the lack of differences between high and low dogmatic individuals is understandable and predictable. Dogmatism, or closed systems of thought and belief, will not be manifested unless new belief systems are put into conflict with older more established belief systems. This we have failed to make possible by presenting the three new beliefs all at once at the beginning of the experiment. The remaining part of this thesis is an attempt to substantiate this theoretical position by experimental validation

while transforming the original error into a more comprehensive understanding of the dogmatic thought processes.

EXPERIMENT #2

SUBJECTS AND PROCEDURE:

Forty subjects were selected for experimental testing in the same manner that the selection was accomplished in Experiment #1. All students taking the introductory psychology course at Michigan State University for the spring term of 1956 were given under classroom conditions the identical questionnaire that has already been discussed. The experimental design and breakdown of subjects was as follows:

GROUP	N		COUNTERBALANCED PRACTICE ORDER	
	MALE	FEMALE	PROBLEM A	PROBLEM B
High Dogmatic	6	4		
Low Dogmatic	4	6	No-Canopy	Canopy
High Dogmatic	5	5		
Low Dogmatic	6	4	Canopy	No-Canopy

Since the results reported in Experiment #1 were attributed to a lack of conflicting beliefs, the second experimental procedure was an attempt to modify the original design in such a way as to produce the necessary conflict between beliefs. In order to eliminate the remote possibility that the lack of results in the first experiment might still somehow be idiosyncratic of the problems, themselves, it was desireable to change the original study as little as possible. This it was felt could be most reasonably accomplished by merely manipulating the times at which the individual beliefs would be given to the subject. The rationale for this was based upon the implicit assumption that witholding

of beliefs would provide the highly dogmatic subject with time to make a personal investment into the problem solving task. With nothing to guide the individual other than his own past experience it was felt that he would of necessity resort to those beliefs that were continually used in everyday living. When the new beliefs are now presented there would be something with which they could be in actual conflict. For purposes of future discussion the first experimental design under which all three beliefs were given immediately at the start of the problem will be simply referred to as the Immediate Card Condition. This revised experimental procedure we will simply refer to as the Spaced Card Condition.

Testing of subjects under the Spaced Card Condition was conducted in an identical manner to the Immediate Card Condition with the following important modification. The new beliefs (in the form of hints typed on cards) were not immediately presented to the subject. For five minutes the subject was permitted to work upon the problem in his own way but following this time interval he was given one of the cards with the statement:

Here is a hint to help you solve the problem.

The card was then left in the subject's visual field throughout the remaining time required to solve the problem. If an individual overcame a belief prior to the five minute time interval, he was presented with the appropriate card at this time and the time was recorded by the Experimenter. When the five minute interval was up he was then given a second hint. The procedure, therefore, was that of giving hints on cards to the subjects at intervals of five minutes; one hint being given at the end of each five minute interval until all sets were overcame.

Hints given experimentally to the subjects were always in the following order: (1) facing set, (2) direction set, (3) movement set. The hints were typed on the individual cards as follows:

1a. Facing set ------(No-Canopy Problem)
"Joe does not have to face the food in order to eat it."

1b. Facing set ------(Canopy Problem)
"Joe must face the food in order to eat it."

2. Direction set ---(No-Canopy and Canopy Problems)
"Joe can jump sideways and backwards as well as forwards."

3. Movement set ----(No-Canopy and Canopy Problems)
"Joe is not necessarily at the beginning or end of a series of jumps. He may have been somewhere in a series of jumps."

The following measures were obtained for each of the subjects tested:

1. Total time taken to solve the problem.

2. Time taken to overcome the first, second, and third sets.

3. Time taken to solve the problem after all three sets were overcome.

4. Number of sets correctly recalled following the five minute rest period.*

5. Recall of correct solution of the problem following the five minute rest period.*

* This recall measure served a dual purpose: (1) it provided a recall measure of the solution for the problem and of the sets, also (2) it served as a basis for starting all subjects on problem two with the correct answer to the first problem.

The specific hypotheses that were tested by the use of the two cognitive tasks were identical to those used in Experiment #1.

A. Individuals high in dogmatism should require more time to solve the problems than individuals low in dogmatism.

B. Individuals high in dogmatism should not, but individuals low in dogmatism should exhibit a facilitative effect when a problem appears in the second position of the counterbalanced practice order.

RESULTS:

Table 3, which compares the performance of high and low dogmatic groups on the problems when these problems appear is the first position of the practice order, is seen as substantiating hypothesis A. The high dogmatic groups exhibited solution times of 31.05 minutes and 34.82 minutes for the No-Canopy and Canopy problems respectively are significantly more than the low dogmatic solution times of 18.37 minutes and 27.58 minutes at the .02 and .07 levels of significance.

A quick review of Table 4, which gives a comparative analysis to that used in Table 3 with the exception that this time it is when the problems appear in the second position of the practice order, indicates that the desired differences between high and low dogmatic groups has apparently been accomplished. The 18.52 minutes required by the high dogmatic group to solve the No-Canopy problem is significantly longer than the 8.12 minutes required by the low dogmatic group at the .06 level of confidence. On the Canopy problem the difference between the high and low dogmatic groups evidenced by the solution times of 20.20 minutes and 15.62 minutes is again in the anticipated direction although it is only at the .07 level of confidence.

TABLE 3

COMPARISON BETWEEN HIGH AND LOW DOGMATIC GROUPS ON THE TOTAL TIME TAKEN TO SOLVE THE NO-CANOPY AND CANOPY PROBLEMS IN THE FIRST POSITION OF THE PRACTICE ORDER

Problem	Group	N	Mean Time	z	p
No-Canopy	High Dogmatic	10	31.05		
	Low Dogmatic	10	18.37	2.08	0.02*
Canopy	High Dogmatic	10	34.82		
	Low Dogmatic	10	27.58	1.48	.07*

* one-tailed test

TABLE 4

COMPARISON BETWEEN HIGH AND LOW DOGMATIC GROUPS ON THE TOTAL TIME TAKEN TO SOLVE THE NO-CANOPY AND CANOPY PROBLEMS IN THE SECOND POSITION OF THE PRACTICE ORDER

Problem	Group	N	Mean Time	z	p
No-Canopy	High Dogmatic	10	18.52		
	Low Dogmatic	10	8.12	1.59	.06*
Canopy	High Dogmatic	10	20.20		
	Low Dogmatic	10	15.62	1.44	.07*

* one-tailed test

DISCUSSION:

This quick review of the data obtained in Experiment #2 suggests that the desired contrast between high and low dogmatic groups has been accomplished. Rather than analyze this data by itself it is felt that a comparative analysis of the two experiments will provide a more meaningful and comprehensive insight into the problem solving methods of the high and low dogmatic individuals.

A COMPARITIVE ANALYSIS OF EXPERIMENTS #1 AND #2

Prior to the testing of subjects in Experiment #2 a series of interrelated hypotheses were drawn up in an attempt to anticipate the relationships between the Immediate Card Condition and the Spaced Card Condition. These hypotheses were as follows:

A. Concerning the effects of the Immediate Card versus Spaced Card Conditions.
   1. Concerning the total time taken to solve the cognitive tasks.
      a. Individuals high in dogmatism should require less time to solve the cognitive problems under the Immediate Card Condition than under the Spaced Card Condition.
      b. Individuals low in dogmatism should solve the cognitive problems in the same amout of time under the Immediate Card Condition as under the Spaced Card Condition.
   2. Concerning the time required to integrate the three beliefs.
      a. Individuals high in dogmatism should integrate the three beliefs as rapidly under the Immediate Card Condition as under the Spaced Card Condition.
      b. Individuals low in dogmatism should integrate the three beliefs more rapidly under the Spaced Card Condition than under the Immediate Card Condition.

B. Concerning the effects of High versus Low Dogmatism.
   1. Concerning the total time taken to solve the cognitive problems.

a. Individuals high in dogmatism should solve the problems as rapidly as individuals low in dogmatism when the problems are presented under the Immediate Card Condition.*

b. Individuals high in dogmatism should require more time to solve the problems than individuals low in dogmatism when the problems are presented under the Spaced Card Condition.

2. Concerning the time taken to overcome the individual beliefs.

a. Individuals high in dogmatism should overcome the specific beliefs as rapidly as individuals low in dogmatism.

3. Concerning the time required to integrate the three beliefs. (Integration time is defined as the amount of time required to reach the problem solution after all three sets have been overcome. Under the Immediate Card Condition the total time and integration time will be identical).

a. Individuals high in dogmatism should integrate the three beliefs as rapidly as individuals low in dogmatism when the problems are presented under the Immediate Card Condition. (This hypothesis is identical with hypothesis B,1,a).

b. Individuals high in dogmatism should require more time to integrate the three beliefs than individuals low in dogmatism when the problem is presented under the Spaced Card Condition. (This hypothesis is really identical with the one put forward by Rokeach, McGovney and Denny (5) and by Vidulich (6).

C. Concerning the transfer effect of the first problem upon the solution of the second problem.

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* This is self-evident from Experiment #1. It is included for comparative purposes only.

1. Individuals high in dogmatism and individuals low in dogmatism should exhibit a similar facilitative effect when a problem appears in the second position of the counterbalanced practice order when the problems are given under the Immediate Card Condition.
2. Individuals high in dogmatism should not, but individuals low in dogmatism should, exhibit a facilitative effect when a problem appears in the second position of the counterbalanced practice order when the problems are given under the Spaced Card Condition.

Consider first the data shown in Table 5 giving the mean solution and integration times for the No-Canopy and Canopy problems for high and low dogmatic groups under the Immediate and Spaced Card Conditions when the problems are given in the first position of the practice order. Tables 6, 7, and 8 deal with various aspects of this table and present statistical comparisons relevant to the theoretical analysis of "party-line" and "genuine" thought processes.

The most striking feature of Table 5 is that whereas the integration times remained substantially identical for high dogmatic groups under either experimental condition; low dogmatic groups integrate faster under a Spaced Card Condition than under an Immediate Card Condition. Total time required for the solution of the problem also provides an interesting contrast between high and low dogmatic individuals. Low dogmatic groups exhibit similar scores for the total solution time under both experimental conditions, but the high dogmatic groups under the Spaced Card Condition

required an increased amount of time to solve the identical problem which was also given under an Immediate Card Condition. The implication of these differences between the high and low dogmatic groups in regards to total time required to solve the problem and the integration time following the overcoming of the specific beliefs is presented more fully in the discussion section of this paper.

The experimental findings relating to hypotheses A,1,a and A,1,b are reported in Table 6. Hypothesis A,1,a states that individuals high in dogmatism should require less time to solve the cognitive problems under the Immediate Card Condition than under the Spaced Card Condition. The mean solution times for the high dogmatic groups under the Immediate Card Condition for the No-Canopy and Canopy problems were 18.65 and 24.76 minutes respectively. The mean times reported under the Spaced Card Condition of 31.05 and 34.82 minutes were both significantly longer at the .03 level of confidence.

Low dogmatic individuals were postulated to require the same amount of time for the problem solutions under both the Immediate Card Condition and the Spaced Card Condition, hypothesis A,1,b. The reported means of 20.13 minutes and 18.37 minutes for the solution of the No-Canopy problem under the Immediate Card Condition and the Spaced Card Condition respectively, were not significantly different. Likewise, the mean solution times of 25.43 minutes and 27.58 minutes for the Canopy problem were also not significantly different.

TABLE 5

A COMPARISON OF EXPERIMENTAL CONDITIONS AND TOTAL AND INTEGRATION TIMES FOR THE NO-CANOPY AND CANOPY PROBLEMS WHEN THESE PROBLEMS ARE GIVEN IN THE FIRST POSITION OF A COUNTERBALANCED PRACTICE ORDER

Problem	Group	Immediate Card Condition	Spaced Card Condition	
		Total & Integration Time	Total Time	Integration
No-Canopy	High Dogmatic	18.65	31.05	20.11
	Low Dogmatic	20.13	18.37	8.96
Canopy	High Dogmatic	24.76	34.82	20.96
	Low Dogmatic	25.43	27.58	13.34

TABLE 6

COMPARISON BETWEEN THE EXPERIMENTAL CONDITIONS ON THE TOTAL TIME TAKEN TO SOLVE THE NO-CANOPY AND CANOPY PROBLEMS WHEN THESE PROBLEMS ARE GIVEN IN THE FIRST POSITION OF A COUNTERBALANCED PRACTICE ORDER

Problem	Experimental Condition	Group	N	Mean Time	z	p
No-Canopy	Immediate Card	High Dogmatic	10	18.65	1.93	.03*
	Spaced Card		10	31.05		
	Immediate Card	Low Dogmatic	10	20.13	0.26	.79
	Spaced Card		10	18.37		
Canopy	Immediate Card	High Dogmatic	10	24.76	1.93	.03*
	Spaced Card		10	34.82		
	Immediate Card	Low Dogmatic	10	25.43	0.49	.62
	Spaced Card		10	27.58		

* one-tailed test

Table 6, therefore, indicates that the total time necessary to solve the cognitive tasks has a relationship to the experimental condition under which the problem is presented to the subject. Highly dogmatic individuals require a significantly smaller amount of time under an Immediate Card Condition than under a Spaced Card Condition, whereas, low dogmatic individuals require substantially the same amount of time under either experimental condition.

The data presented in Table 7 is again a comparison between experimental conditions, but the measure rather than being the total time to solve the cognitive tasks is now the time required to integrate the three beliefs and arrive at the problem solution. Integration time has already been operationally defined as the time required to reach the problem solution following the overcoming and presentation of all three beliefs. This definition of integration time is consistent with that used in both the Rokeach, McGovney, and Denny study (3) and the Vidulich study (6).

Hypothesis A,2,a states that individuals high in dogmatism should integrate the three beliefs in the same amount of time under the Immediate Card Condition as under the Spaced Card Condition. The results reported in Table 7 clearly substantiates this. On both of the cognitive tasks, the No-Canopy and Canopy problems, the contrasting mean integration times of 18.65 minutes versus 20.11 minutes for the No-Canopy problem and 24.76 minutes versus 20.96 minutes for the Canopy problem are not significantly different from each other.

TABLE 7

COMPARISON BETWEEN THE EXPERIMENTAL CONDITIONS ON THE TIME TAKEN TO INTEGRATE THE THREE NEW BELIEFS OF THE NO-CANOPY AND CANOPY PROBLEMS WHEN THESE PROBLEMS ARE GIVEN IN THE FIRST POSITION OF A COUNTERBALANCED PRACTICE ORDER

Problem	Experimental Condition	Group	N	Mean Time	z	p
No-Canopy	Immediate Card	High Dogmatic	10	18.65	0.19	.85
	Spaced Card		10	20.11		
	Immediate Card	Low Dogmatic	10	20.13	2.61	.001*
	Spaced Card		10	8.96		
Canopy	Immediate Card	High Dogmatic	10	24.76	0.79	.43
	Spaced Card		10	20.96		
	Immediate Card	Low Dogmatic	10	25.43	2.08	.02
	Spaced Card		10	15.34		

* one-tailed test

In regards to the integration times for the low dogmatic groups it was postulated that under the Spaced Card Condition the integration times would be significantly less than under the Immediate Card Condition, hypothesis A,2,b. For the No-Canopy problem the reported means were 20.13 minutes for the Immediate Card Condition and 8.96 minutes for the Spaced Card Condition; this difference being significant at the .001 level. On the Canopy problem the mean integration time under the Immediate Card Condition was 25.43 minutes as contrasted to 15.34 minutes under the Spaced Card Condition. This difference is significantly different at the .02 level.

Table 8 provides further insight into the performance of high dogmatic and low dogmatic individuals under the two experimental conditions. This time the comparison is being made between the personality variables of high versus low dogmatism. Hypothesis B,1,a states that individuals low in dogmatism should solve the problems as rapidly as individuals high in dogmatism when the problems are presented under the Immediate Card Condition. The reported mean solution time of 18.65 minutes for the high dogmatic group on the No-Canopy problem was not significantly different from the mean time of 20.13 minutes exhibited by the low dogmatic group. Likewise, on the Canopy problem the mean times of 24.76 minutes and 25.43 minutes for the high dogmatic group and the low dogmatic group respectively, were not significantly different.

Under the Spaced Card Condition, however, it was hypothesized that individuals high in dogmatism should require more time to solve the problems than individuals low in dogmatism, hypothesis B,1,b. Mean

TABLE 8

COMPARISON BETWEEN HIGH AND LOW DOGMATIC GROUPS UNDER TWO EXPERIMENTAL CONDITIONS ON THE TOTAL TIME TAKEN TO SOLVE THE NO-CANOPY AND CANOPY PROBLEMS WHEN THESE PROBLEMS ARE GIVEN IN THE FIRST POSITION OF A COUNTER-BALANCED PRACTICE ORDER

Experimental Condition	Problem	Group	N	Mean Time	z	p
Immediate Card Condition	No-Canopy	High Dogmatic	10	18.65	0.34	.73
		Low Dogmatic	10	20.13		
	Canopy	High Dogmatic	10	24.76	0.11	.91
		Low Dogmatic	10	25.43		
Spaced Card Condition	No-Canopy	High Dogmatic	10	31.05	2.08	.02*
		Low Dogmatic	10	18.37		
	Canopy	High Dogmatic	10	34.82	1.48	.07*
		Low Dogmatic	10	27.58		

* one-tailed test

solution times for the No-Canopy problem were 31.05 minutes and 18.37 minutes for the high and low dogmatic groups respectively indicating that a difference in solution times did exist, with the high dogmatic group requiring the longer period of time. This difference was significant at the .02 level. On the Canopy problem the difference in solution times approached significance being at the .07 level with the high dogmatic group requiring 34.82 minutes and the low dogmatic group requiring 27.58 minutes.

A comparison of Tables 6 and 8 affords additional insight into the problem solving performances of the high and low dogmatic individuals on the two cognitive tasks. The high dogmatic groups, regardless of the cognitive task employed, required a significantly increased amount of time to solve the problem under the Spaced Card Condition. Low dogmatic groups, however, solve the problems in substantially the same amount of time under either of the experimental conditions. Moreover, it is important to note that the increased solution times of the high dogmatic groups under the Spaced Card Condition are significantly greater than the amount of time required by low dogmatic groups to arrive at the problem solutions under the identical experimental condition.

Before comparing the integration times required by the high and low dogmatic subjects it is important to determine whether or not the increased total time required by high dogmatic subjects to solve the cognitive tasks can be attributed to the fact that they may require a longer period of time to overcome the individual beliefs, themselves. Hypothesis B,2,a

addresses itself to this question. It was hypothesized that individuals high in dogmatism should overcome the specific beliefs as rapidly as individuals low in dogmatism.

The data presented in Table 9 substantiates hypothesis B,2,a and also the findings reported in the studies by Rokeach, McGovney, and Denny (3) and Vidulich (6). Dogmatism, in the two preceding studies, was equated with the integration process, per se; the overcoming of sets being dependent upon the rigidity of an individual. A Chi-square analysis of the number of beliefs (sets) overcome in the first ten minute interval indicates that there were no significant differences in time between the high and low dogmatic groups in regards to the overcoming of individual beliefs. Therefore, the increased time exhibited by high dogmatic groups in relation to the low dogmatic groups under the Spaced Card Condition cannot be attributed to this factor.

Table 10 which is a comparison between high and low dogmatic groups on the time taken to integrate the three new beliefs when the problems are presented in the first position of the practice order, clearly substantiates hypotheses B,3,a and B,3,b which state that high and low dogmatic groups should exhibit similar integration times under an Immediate Card Condition, but not under a Spaced Card Condition. The mean integration times of the high dogmatic groups on the No-Canopy and Canopy problems under an Immediate Card Condition were 18.65 minutes and 24.76 minutes respectively; with the low dogmatic group exhibiting integration times of 20.13 and 25.43 minutes. The reported probabilities

TABLE 9

NUMBER OF SETS OVERCOME WITHIN THE FIRST TEN MINUTES BY HIGH AND LOW DOGMATIC GROUPS ON THE NO-CANOPY AND CANOPY PROBLEMS COMBINED

Group	Number of Sets Overcome				Chi^2	df	p
	0	1	2	3			
High Dogmatic	4	7	4	5			
					0.40*	1	N.S.
Low Dogmatic	2	6	3	9			

* 0 and 1 combined, 2 and 3 combined to eliminate theoretical frequencies below 5

TABLE 10

COMPARISON BETWEEN HIGH AND LOW DOGMATIC GROUPS UNDER TWO EXPERIMENTAL CONDITIONS ON THE TIME TAKEN TO INTEGRATE THE THREE NEW BELIEFS OF THE NO-CANOPY AND CANOPY PROBLEMS WHEN THESE PROBLEMS ARE GIVEN IN THE FIRST POSITION OF A COUNTERBALANCED PRACTICE ORDER

Experimental Condition	Problem	Group	N	Mean Time	z	p
Immediate Card Condition	No-Canopy	High Dogmatic	10	18.65	0.34	.73
		Low Dogmatic	10	20.13		
	Canopy	High Dogmatic	10	24.76	0.11	.91
		Low Dogmatic	10	25.43		
Spaced Card Condition	No-Canopy	High Dogmatic	10	20.11	1.85	.03*
		Low Dogmatic	10	8.96		
	Canopy	High Dogmatic	10	20.96	1.40	.08*
		Low Dogmatic	10	15.34		

* one-tailed test

of .73 and .91 for these mean differences indicates that high and low dogmatic individuals require substantially the same amount of time for the integration process when the hints are given immediately at the start of the problem by experimental means.

When the identical cognitive tasks are presented with the utilization of the Spaced Card Condition, the postulated differences between high and low dogmatic groups stated in hypothesis B,3,b emerge. The integration times required by the high dogmatic groups in the No-Canopy and Canopy problems were 20.11 and 20.96 minutes respectively. The faster rate of integration exemplified by the low dogmatic group's mean integration time of 8.96 minutes on the No-Canopy problem is significant at the .03 level. Although the integration time of the low dogmatic group on the Canopy problem is also in the hypothesized direction, it is significant at only the .08 level.

From the reported integration times for high and low dogmatic groups in Table 10, it may therefore be concluded that in so far as the No-Canopy problem is concerned, the hypothesized distinctions between high and low dogmatic groups under an Immediate Card Condition and under a Spaced Card Condition are upheld by the experimental evidence. The data presented in Tables 6,7,8 and 10 also suggests that the Canopy problem is inherently a more difficult problem than the No-Canopy problem.

Tables 11 and 12 present the data on the two cognitive tasks when these problems are given in the second position of the practice order. Inspection of the integration times for high and low dogmatic groups (Table 11) illustrates that hypothesis B,3,a and hypothesis B,3,b are again upheld. That is, under the Immediate Card Condition the high dogmatic group integrates the three beliefs as rapidily as the low dogmatic group, and under the Spaced Card Condition the high dogmatic group requires more time to integrate the three beliefs than the low dogmatic group.

The mean integration times of 4.10 minutes and 5.30 minutes for the high dogmatic and low dogmatic groups respectively in the No-Canopy problem were not significantly different and the integration times of 15.82 minutes and 21.18 minutes for the Canopy problem were also not significantly different. Under the Spaced Card Condition, when the cognitive task is presented in the second position, the low dogmatic groups integrate the beliefs faster than the high dogmatic groups. The difference between high and low dogmatic groups of 17.18 minutes for highs and 6.46 minutes for lows on the No-Canopy problem is significant at the .05 level of confidence. On the Canopy problem the high dogmatic group required a mean time of 17.61 minutes for the integration process with the low dogmatic group requiring 11.97 minutes. This difference although not significant (.09 level) is in the expected direction.

So far all that the data presented on the second cognitive task can be used to explain is that the hypothesized differences between

TABLE 11

COMPARISON BETWEEN HIGH AND LOW DOGMATIC GROUPS UNDER TWO EXPERIMENTAL CONDITIONS ON THE TIME TAKEN TO INTEGRATE THE THREE BELIEFS OF THE NO-CANOPY AND CANOPY PROBLEMS WHEN THESE PROBLEMS ARE GIVEN IN THE SECOND POSITION OF A COUNTERBALANCED PRACTICE ORDER

Experimental Condition	Problem	Group	N	Mean Time	z	p
Immediate Card Condition	No-Canopy	High Dogmatic	10	4.10	1.17	.24
		Low Dogmatic	10	5.30		
	Canopy	High Dogmatic	10	15.82	1.17	.24
		Low Dogmatic	10	21.18		
Spaced Card Condition	No-Canopy	High Dogmatic	10	17.18	1.62	.05*
		Low Dogmatic	10	6.46		
	Canopy	High Dogmatic	10	17.61	1.32	.09*
		Low Dogmatic	10	11.97		

* one-tailed test

high and low dogmatic groups under a Spaced Card Condition appears to be a valid one. The question that remains to be answered is whether or not there is any "real" savings in the second problem. In other words, it must be shown that the integration time in the second position of the practice order is significantly less than the integration time required when the identical problem appears in the first position. The data presented in Table 12 addresses itself to this question.

Highly dogmatic individuals, under the Immediate Card Condition, exhibit a considerable savings in having the cognitive task given in the second position. The difference in mean times on the No-Canopy problem of 18.65 minutes for the first position and 4.10 minutes when the problem is in the second position, is highly significant (.0004 level). On the Canopy problem the mean integration times of 24.76 minutes versus 15.82 minutes is also significant; this time at the .02 level.

Low dogmatic individuals also show a facilitative effect of having the No-Canopy problem appear in the second position when the problems are given under the Immediate Card Condition. The mean integration times of 20.13 and 5.30 minutes are significantly different at the .0001 level. However, in regards to the Canopy problem, the low dogmatic group did not receive as much of a facilitative effect as was anticipated. The reported differences of 25.43 minutes for the first position and 21.18 minutes for the second position had a probability level of only .14.[4]

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4 An analysis of the Canopy Problem is presented in the discussion section of this paper.

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COMPARISON BETWEEN HIGH AND LOW DOGMATIC GROUPS SHOWING THE POSITION EFFECTS OF THE NO-CANOPY AND CANOPY PROBLEMS UNDER THE TWO EXPERIMENTAL CONDITIONS

Experimental Condition	Problem	Position	Group	N	Mean Time	z	p
Immediate Card Condition	No-Canopy	1	High Dogmatic	10	18.65		
		2	High Dogmatic	10	4.10	3.33	.0004*
		1	Low Dogmatic	10	20.13		
		2	Low Dogmatic	10	5.30	3.70	.0001*
	Canopy	1	High Dogmatic	10	24.76		
		2	High Dogmatic	10	15.82	2.12	.02*
		1	Low Dogmatic	10	25.43		
		2	Low Dogmatic	10	21.18	1.06	.14*
Spaced Card Condition	No-Canopy	1	High Dogmatic	10	20.11		
		2	High Dogmatic	10	17.18	0.68	.50
		1	Low Dogmatic	10	8.96		
		2	Low Dogmatic	10	6.46	1.66	.05*
	Canopy	1	High Dogmatic	10	20.96		
		2	High Dogmatic	10	17.61	1.13	.26
		1	Low Dogmatic	10	15.34		
		2	Low Dogmatic	10	11.97	1.44	.07*

* one-tailed test

The Spaced Card Condition, which was the crucial experimental condition, substantiates hypothesis C,2 which stated that individuals high in dogmatism should not, but individuals low in dogmatism should, exhibit a facilitative effect when a problem appears in the second position. Their, highly dogmatic individuals, integration times on the No-Canopy problem of 20.11 minutes for the first position and 17.18 minutes for the second position are not significantly different. On the Canopy problem the results are again in the anticipated direction with a probability of .26 being reported for the differences of 20.96 minutes versus 17.61 minutes.

Low dogmatic individuals, under the Spaced Card Condition, not only integrated faster than the high dogmatic individuals on the tasks when they appeared in either the first or second position; but also showed a facilitative effect in having a problem appear in the second position of the practice order. The mean integration times on the No-Canopy problem of 8.96 and 6.47 minutes were significantly different at the .05 level. Although the difference in integration times on the Canopy problem was again of a lower level of significance it was, however, clearly in the expected direction. In the first position a mean integration time of 15.34 minutes was found, whereas in the second position only 11.97 minutes was needed. This reported difference was at a probability level of .07.

DISCUSSION

The major purpose of this study was to attempt an experimental and theoretical analysis which would serve to differentiate "party-line" thinking from the more constructive mode of thought. It is fully realized that the distinction made entails an implicit value judgement in stating that the one is thinking upon a higher, more efficient level. "Party-line" thinking was conceived as being a non-integrative process and involving a low transfer of training effect; or in other words, a mode of thought which does not lend itself readily to solving similar tasks in future situations. "Genuine" thought processes were conceived as being of an integrative nature, being readily adaptable and transferable to new situations in which the past experience could be utilized.

Why high dogmatic individuals should solve the problems as rapidly as low dogmatic individuals when hints are given immediately at the start of the problem situation is an interesting question. The explanation upheld by this author, which is also consistent with the "thought-belief" model of Rokeach (5) hinges upon two considerations. First of all, it is readily apparent that the Doodle-bug problems are extremely novel to a subject and, therefore, in attempting to solve it one finds himself confronted with a puzzling set of conditions foreign to everyday thought and problem-solving behavior. Secondly, the Experimenter in charge of the problem-solving task is in a position of an authority figure with the ultimate acceptance of any proposed solution having to be reconciled with his viewpoint. It is the interaction of these two facts that promotes the

The Vidulich study (6) indicated that the poorer integration of highly dogmatic individuals was the result of their attempting to modify or reject the problem situation, including in some cases the Experimenter, himself. When beliefs are presented at the beginning of the problem-solving task they take on an added degree of importance. Rokeach (5) mentioned that "All information impinging upon the person from the outside must be processed or coded in such a way so that the information is rejected or else fitted somehow in this system." Also, in regards to the "fitting-filing process" he states, "The new information is communicated from the intermediate (authority) region to the peripheral region not in the form of information but in the psychological form of a new belief or disbelief." What appears to be happening in the Immediate Card Condition is that the entire problem situation has become a miniature closed system with the Experimenter in the role of authority; consequently the beliefs are wholeheartedly accepted as "true" beliefs upon the part of the highly dogmatic individual. Moreover, these beliefs, by virtue of the fact that they are all presented immediately to the subject at the beginning of the experiment are not seen as contradictory beliefs in their present belief system. Hence, there is less resistance to their acceptance.

In contrast to the Immediate Card Condition, consider now the beliefs which are presented under a Spaced Card Condition. The high dogmatic individual has to arrive at each new belief by first overcoming a contradictory belief which he holds in his everyday world. This leads to greater resistance by the high dogmatic subject whose present belief system is more

The performance of the low dogmatic groups under the two experimental conditions also needs further analysis to fully present the theoretical position advanced in this paper. It must be remembered in viewing the experimental data gathered on low dogmatic individuals that they represent the theorized "genuine" or integrative thinkers. What is meant by the term "integration," and how does this information lend itself to the theoretical analysis of the reported data? Integration is usually defined in terms of an act of combining the several parts into a whole. In the Doodlebug Problem it is equated with the combining of the sets and arriving at a satisfactory solution. However, both the high and low dogmatic groups do, in time, combine the parts of the system arriving at the correct solution to the problem. In other words, both groups exemplify the fact that integration has occurred. Does this imply that the processes are the same in both instances although the times required for the process to occur are different?

The time factor involved in the integration process is conceived as being a crucial variable. Vidulich's study (6) illustrated that the increased time for integration exhibited by high dogmatic individuals was due in part to the attempts at altering and rejecting the beliefs needed for the problem solution. This attempted rejection and alteration is hardly consistent with the meaning of the word integration. The performance of the highly dogmatic individuals in the studies of Rokeach, McGovney and Denny (3) and Vidulich (6) was in reality a "pseudo-integration! Low dogmatic individuals in solving the cognitive tasks were

attempting to combine the beliefs into a systematic, meaningful system; high dogmatic individuals were also attempting to combine the beliefs in order to arrive at a solution, but they were primarily concerned with retaining the consistency of their own beliefs and disbeliefs. This attempt upon the part of highly dogmatic individuals to retain the consistency of their own previously formulated system about reality, resulted in the new information being "narrowed" out or else altered in some manner. The low dogmatic individual does not have as much at stake in so far as the retention of a previously conceived system is concerned and therefore attempts to integrate the new beliefs as they stand.

Under an Immediate Card Condition the high dogmatic individual has not had sufficient time to test his own beliefs against the newly proposed ones. When given time for some personal investment in the problem situation and finding his own belief system inoperative (Spaced Card Condition) he finds it easier to alter or reject altogether the new beliefs than to disavow the utility of his own belief system in this newly created situation. The low dogmatic individual, being one who will quite readily test the practical utility of his own previously held beliefs in a novel situation, realizes their shortcomings and concentrates upon understanding and operating within the sphere of new beliefs. The Spaced Card Condition produces a faster integration time since it has already provided him with time to reject his own previously conceived belief-system and now he need only integrate the newer beliefs. Under an Immediate Card Condition this rejection of the utility of one's own

beliefs in the new system is confounded in the time measure with the actual integration process, itself.

Table 5, which contrasts the integration and total time measures under the two experimental conditions, may be viewed as lending support to this theoretical position. The low dogmatic groups under an Immediate Card Condition and a Spaced Card Condition require substantially the same amount of time for the problem solution. Integration time, however, is shorter under a Spaced Card Condition. The procedure of the low dogmatic individual in his attempts to solve the cognitive task is identical under the two experimental conditions but the integration measure is confounded in the Immediate Card Condition.[5]

Highly dogmatic individuals can be seen in Table 5 as exhibiting similar integration times for the Immediate Card Condition and the Spaced Card Condition. When one studies the data for total time to solve the cognitive task, it becomes readily apparent that the total time increases drastically under the Spaced Card Condition. It is under this experimental

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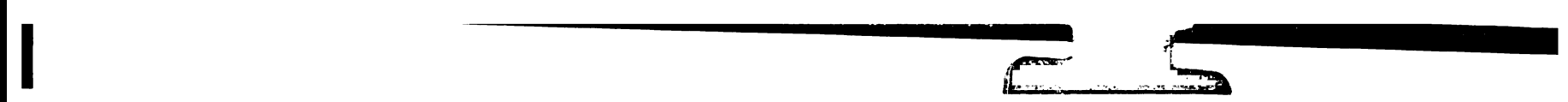
5 The relatively poorer performance of the low dogmatic group upon the Canopy problem, Table 5, may actually be an additional assertion of the superior quality of performance on the part of these individuals. The one jump south necessary in the Canopy problem lacks somewhat in elegance of problem design due to the fact that it is not quite cogent with the laws of physics. High dogmatics under the Immediate Card Condition probably do not test the reality of this type of jump, e.g. under the Spaced Card Condition high dogmatics integrate in 20.11 minutes (No-Canopy Problem) and 20.96 minutes (Canopy Problem) ----- low dogmatics integrate in 8.96 minutes (No-Canopy Problem) but require 13.34 minutes (Canopy Problem).



condition that the high dogmatic individual becomes entangled with the problem of refuting his previously held beliefs in favor of the newly presented beliefs.

Table 12 presents the data which provides a quantitative measure of the quality of the integration process that took place when a problem appeared in the first position of the practice order. If a truly integrative process occurred in the solution of the first problem, one would logically expect this integration to facilitate later problem-solving conducted under similar circumstances. From the design of the two cognitive tasks, it is readily apparent that an individual attempting to solve a second Doodlebug Problem, be it the No-Canopy or the Canopy problem, has already had experience in utilizing two of the new beliefs. Furthermore, there is nothing new that really has to be relearned about these two beliefs. The necessary interaction of these two beliefs has already been experienced. Therefore, if a "true" integration has occurred we can expect this to manifest itself in a decreased integration time for a given cognitive task when this problem is given in the second position of the counterbalanced practice order.

The theoretical analysis presented earlier predicts that under an Immediate Card Condition both the high and low dogmatic groups should exhibit a "genuine" type of integration. In all cases, with the exception of the low dogmatic group solving the Canopy problem, this postulated savings in time occurs at a highly significant level. The performance of the high and low dogmatic groups under the Spaced Card Condition clearly substantiates the theoretical distinction between "party-line" and "genuine"

thought processes. Highly dogmatic individuals do not show a savings in having a problem appear in the second position of a counterbalanced practice order (.50 and .26 levels of significance); low dogmatic individuals do show a facilitative effect in the second position (.05 and .07 levels of significance).

SUMMARY AND CONCLUSIONS

The purpose of this study was to present a theoretical and experimental analysis of the phenomenon popularly labeled "party-line" thinking. It was accomplished by the use of two specially devised problems both of which involved the integration of multiple sets into a new belief system. "Party-line" thinking was conceived as being primarily a non-integrative procedure, whereas, "genuine" thinking was equated with an integrative activity. Furthermore, the study was also conceived as an extension and validation check upon earlier experimental work conducted at Michigan State University upon the belief-thought model of Rokeach (2,3,5,6).

Two experimental conditions were imposed upon the problem-solving tasks; (a) an Immediate Card Condition, in which all the new beliefs were presented on cards in the form of hints immediately at the start of the experiment, and (b) a Spaced Card Condition, in which the beliefs were presented individually at predetermined time intervals.

Under the Immediate Card Condition the problems were solved in substantially the same amount of time by high and low dogmatic groups. When the problems were given under a Spaced Card Condition it was hypothesized that high dogmatic groups would require more time for the integration process than those low in dogmatism, and this integration would be of a less efficient nature.

ne entire introductory psychology class for both the winter
ring terms of 1956 were given the Dogmatism Scale with an
nental group of eighty subjects being chosen for testing such
orty were high in dogmatism and forty were low in dogmatism.
experimental subjects were then randomly assigned to the
experimental conditions with ten subjects per group. The
nental design for both the Immediate Card and Spaced Card
ions was as follows:

ROUP	N	COUNTERBALANCED PRACTICE ORDER	
		PROBLEM A	PROBLEM B
gh Dogmatic	10	No-Canopy	Canopy
w Dogmatic	10		
gh Dogmatic	10	Canopy	No-Canopy
w Dogmatic	10		

e two cognitive tasks, labeled the No-Canopy and the Canopy
s, were given in the counterbalanced practice order to determine
sible transfer effect of having a problem appear in the second
n of a series of similar problems. It was hypothesized that
wo of the three beliefs to be integrated in a problem in the
position would have already been used in solving the first problem;
tance in which a significant decrease in time did occur would be
ive of "genuine" thinking and any instance in which a significant
e in time did not occur would be indicative of "party-line"

3.

In regards to the second problem in the practice order, it was found that high dogmatic and low dogmatic groups both display a facilitative effect indicative of a "genuine" integration having occurred in the solution of the first problem when the problem is given under an Immediate Card Condition. Under a Spaced Card Condition it was hypothesized that low dogmatic individuals would again manifest a distinct savings in integration time exemplifying the existence of "genuine" integration on the first problem. However, high dogmatic individuals under a Spaced Card Condition should not show a significant decrease in integration time when a problem appears in the second position of the counterbalanced practice order. This lack of savings is equated with the idea that highly dogmatic individuals under a Spaced Card Condition do not manifest a "genuine" change in the first problem, but in reality exemplify what has been labeled as "party-line" (non-integrative) thinking.

The findings of the study are in accord with the hypotheses posed and lend support to the construct of dogmatism while also demonstrating the importance of personality variables in problem-solving behavior. An important implication of the study is that terms derived from everyday discourse, in this instance "party-line" thinking, are amenable to theoretical and experimental manipulation.

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