THE EFFECT OF ANXIETY ON REAL LIFE

PROBLEM SOLVING PERFORMANCE

OF GIFTED CHILDREN IN ISRAEL

by

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B.A. Haifa University, Israel 1969

M.A. Northeastern University, Boston, 1973
A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF EDUCATION

in

THE   FACULTY OF GRADUATE STUDIES

Department of Educational Psychology and Special Education

We accept this thesis as conforming

to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

April 1991

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Date Aug. 27, 1991

ABSTRACT

The purpose of this study was to explore the effect of anxiety on real life problem solving performance of gifted children. The study was carried out in Israel, a country in which the necessity of solving real life problems under conditions of anxiety is a real concern.

142 gifted and nongifted subjects from 4th, 5th and 6th grades participated in the study.

Trait and State Anxiety Inventories for Children (Spielberger, 1973), and a Real Life Problem Solving Situation Set (RLPSSS), were used to assess the subjects' Trait anxiety, State anxiety and real life problem solving performance respectively.

The subjects in each class were divided into two matched groups based on their Trait Anxiety scores, the subjects gender and their scholastic achievements. One of them was randomly assigned to be the treatment group and the other the nontreatment group.

The "treatment" consisted of deliberate induction of anxiety via a combination of elements that are known to elicit anxiety in school children. Matched t-tests on anxiety scores, before and after treatment, indicated that the treatment was effective in both populations, the gifted and the nongifted. Ethical issues were taken into consideration.

Analysis of RLPSSS indicated that: (1) gifted children performed significantly better than their nongifted counterparts under conditions of treatment as well as under condition of non-treatment; (2) the performance of all the

groups who experienced anxiety, was lower than that of their matched groups who performed under their natural setting conditions; (3) no interaction was found between giftedness and anxiety; (4) under conditions of anxiety gifted girls appeared to perform slightly better than gifted boys.

The implications from this study concern the attitude toward anxiety which should be dealt with as part of life, rather than as a pathological feature. It is suggested to consider the introduction of anxiety scales into test batteries used for the identification of gifted children and that special programs for the gifted make provisions for providing the gifted students with the necessary skills to cope with life problems under all kinds of anxiety circumstances.

TABLE OF CONTENTS

List of Tables

List of Figures

Acknowledgements

I would like to express my sincere appreciation to the following people: My advisor Prof. Stanley Blank who guided me throughout my graduate studies, and inspired me to meet this challenge, in spite of all the difficulties associated with language, culture, and long distance. Prof. Walter Boldt for his time and ability in conveying his criticisms in a most pleasant style. His analysis, comments and explanations were most significant in facilitating the completion of this thesis. Prof. Art More for assisting me always with a warm smile, to understand and accept criticism. His encouragement was most meaningful; Dr. Eric Hampton for the wonderful job he accomplished in editing this thesis. Dr. David Ben-Haim for his fruitful discussions, helpful ideas and the great amount of time he devoted to helping me. Mrs. Aviva Ya'ar and her wonderful team of teachers accomplished a great job in organizing all the many details that were involved in pursuing this study; Haia and her group of the university students who served as assistants; the team of judges; the English teachers; the teachers who were involved in the Pilot study; Jody and my school staff who put so much time in preparing all the materials for this study. Last but not least, my husband, Uri, for inspiring me with his critical discussions, suggestions and a lot of understanding during the process of writing, which enabled me to bring this thesis to its completion.

Thank you all, I appreciate your efforts and hope that they were worthwhile.

CHAPTER I

INTRODUCTION TO THE STUDY

Immediate Concerns

The impact of anxiety on the responses of Israeli gifted children to solve real life problems is the main interest of the study.

This chapter includes: background, discussion of the purpose of the study and its rationale, elaboration on the main problem and the research questions to be answered, description of the main terms that are repeatedly mentioned throughout this thesis, and discussion of the limitations and constraints.

Background

The education of gifted children has gained considerable attention in the last two decades. This is demonstrated by the various programs instituted in the United States, as a consequence of the report by the U.S. Office of Education to the American Congress (1972). The concern is in the interests of the children themselves as well as in the larger interest of society.

The concern for the gifted children emphasizes their special need for qualitatively different approaches from those existing in the regular school. The need is for: "flexible administrative arrangements for instruction both in and out of school, such as special classes, seminars,

resource rooms, independent study, student internships, mentorships, research field trips, library, media, research centers" (USDE, 1976, p.18665-18666).

Only with these arrangements will the education offered to gifted children challenge them and cultivate their potential talents to the highest degree.

The concern of our highly technological, modern democratic society is for talented people to handle complex problems. "Democracies collapse only when they fail to use intelligent, imaginative methods for solving their problems. Greece failed to heed such a warning by Socrates and gradually collapsed" (Torrance, 1962 p.6). There is a need for graduates who can think clearly and cope successfully with the many challenges (and threats) presented in modern society.

Gifted students are broadly defined in P.L 97-35, the Education Consolidation and Improvement Act, passed by the U.S.A Congress in 1981, as:

> Children who give evidence of high performance capability in areas such as intellectual, creative, artistic, leadership capacity, or specific academic fields, and who require services or activities not ordinarily provided by the school in order to fully develop such capability (sec. 582, cited by Clark 1983, p.5).

There is vast literature dealing with many aspects of the identification of intellectually-gifted children. At present, the gifted in Israel are, for the most part, selected for participation in special programs on the basis of their performance on a battery of Intelligence tests

(see: description of terms - "gifted"). The results of these tests are intended to predict high achievement in the regular school. However, because there is a growing awareness of the need to encourage the gifted to use all their potential, the curriculum for the gifted is in many cases different from that of the regular school.

Much of the emphasis in the special programs for the gifted is on qualitatively different curricula, where the gifted, according to Renzulli (1977), are supposed to "apply thinking and feeling processes to real situations rather than structured exercises" [p.9].

It is intended that the gifted who are identified and selected will benefit from the special programs designed for them in terms of their capability to cope with future real life situations. The attainment of this long-term goal is yet to be seen.

Ideally, the identification process that selects children to participate in these special programs should predict precisely their likelihood of success in the programs and later in life. However, the refinement of the necessary processes will take time, and in the meantime we have to compromise and be aware of this constraint.

This study deals with the gifted who were identified as such by the existing procedures. The focus is on the ability of the gifted to successfully solve problems in real life situations (see Description of Terms - Real Life Problem-Solving). In this respect the issues that are covered in

the research literature deal mainly with aspects of enhancing problem-solving capacity in general. These issues include: a) environmental influences (inside and outside class such as, interaction with parents, teachers, peers and other persons). b) Cognitive ability and style, and c) personality characteristics, such as self-esteem, sociability and self-motivation (Torrance, 1980).

Little research has been done concerning the factors that might inhibit the problem-solving performance of some gifted children. Thus, it seems important to pursue a new line of investigation, in respect of this capacity. From this perspective one should be able to anticipate related obstacles, such as anxiety that may be encountered.

Purpose of the study

The purpose of this study is to investigate the manner in which gifted children under conditions of anxiety attempt to solve real life problems.

The literature on the influence of anxiety on performance in problem-solving does not deal with gifted children specifically. Similarly, the literature on problem-solving of gifted children does not adequately examine anxiety in this context. Further, the literature that compares the anxiety of gifted children with that of others in their age groups does not discuss real life problem-solving specifically (see: Literature Review Chapter II).

In view of these deficiencies, the focusing on issues concerned with the impact of anxiety on the real life problem-solving performance of gifted children is a valuable undertaking.

Having determined the effect of anxiety on the problem-solving performance of the gifted, one could use the results directly for two practical purposes:

a) The improvement of the identification process of the gifted: As a result of additional insight, it may be possible to re-examine current procedures and make some recommendations concerning the battery of tests used to identify the gifted. The inclusion of anxiety-testing and real life oriented problem-solving testing might be a real possibility.

b) Developing appropriate programs for the gifted children: The development/design of programs which will either have predesignated built-in levels of anxiety, in order to help the gifted learn to deal with this kind of emotion, or will include strategies for reducing the level of anxiety.

Essentially, the present study is exploratory, in that its findings may lead to the development of a new line of research. The nature and direction of any recommendations are depended on the actual findings in this line of research.

Rationale

Life is essentially a continuous process of problem-solving. This process is often associated with various degrees of stress. A problem-solving situation is thus an unbalanced dynamic situation, in which stress is created, and the individual involved strives to find a solution which will result in restoring the balance and relieving the stress.

Stress situations elicit anxiety in the individual. Each individual responds with a different level of anxiety to the same stressful situation. (Cox, 1978).

An important aspect when facing a problematic situation is the confrontation with the unknown (Nezu, 1986). The unknown is threatening for most persons. Decisions made and actions taken to solve problems may be crucial in terms of the possible consequences in certain real life situations in which the unknown plays a major role. Consequently, the development of anxiety is to be expected under such conditions. The person involved may not be sure if his decision will solve the problem, or if it will further complicate it, so that the process may end up with detrimental consequences. Therefore, any research that deals with problem-solving in real life situations should seriously consider the possible effects of anxiety (or fear) on problem-solving performance.

Anxiety can be estimated by using existing anxiety scales (Sarason, 1960; Speilberger, 1973). The scales

estimate the extent to which anxiety level varies from person' to person.

The distinction made by Milgram (1976) and Perron and Male (1981), regarding the difference between fear of failure and striving for success, also suggests that non-gifted students who fear failure will use a substantial portion of their energy to overcome this fear. These students are in an anxiety-inducing situation, and therefore will act specifically to reduce their anxiety. Their goal is to avoid failure and to restore balance. They are not willing to take risks beyond what is required for their "survival". They will try to avoid direct confrontation with a problem as much as possible, in order to escape the consequences of failure.

On the other hand, gifted students who are relatively more successful in meeting academic challenges, appear to be more willing to take risks in solving problems left unanswered.

The question is, how would the gifted perform under a non-academic real life threat which elicits problem-solving situations.

The present study was conducted in Israel, a country characterized by a highly technological and stressful society which strives to retain its democracy. The problems that have to be dealt with are enormous (the economic, security, social integration and education, to mention but a few). Thus, there is an urgent need for a very talented

leadership, capable of performing well and efficiently under conditions of great stress.

Awareness of this need has led to the establishment of special classes for gifted children, starting in the fourth grade of the elementary school. The graduates of these programs have to take responsibility at a young age (18 years) for problem-solving and decision-making, starting with army service, and later, in their civic responsibilities. Their decisions may very often be matters of life and death, and these decisions are being made in situations of great stress that could give rise to anxiety in any human being. For example: A situation in which an 18-year-old, engaged in his compulsory army service, is being attacked by young children throwing stones of a size and in such manners as to be life threatening. No communication can be established with these children. This youngster is confronted with the problem of how to respond effectively in order to protect himself and the other young soldiers under his command, without hurting the children.

For this reason alone, a study directed to the effects of anxiety on real life problem-solving performance of the gifted in Israel is both relevant and urgently needed.

The Problem

The essential problem with which this study is concerned is whether the presence of anxiety generates meaningful differences in the way gifted children deal with real life problems.

Whenever an individual confronts a problem, psychological disharmony is a likely consequence. The more stressful the situation, the more urgent the call for a solution and the restoration of the balance re-established.

It is reasonable to assume that a stressful situation tends to arouse anxiety in people who are facing problems and who must contend with the consequences (see: Description of Terms: Anxiety). There is the need to examine to what extent the presence of anxiety generates noteworthy differences in the way gifted children attempt to resolve real life problems. Understanding this issue is crucial, because there is the hope that many of the gifted who graduate from special programs will become leaders in different areas of national life, and hence will be responsible for the way problems are handled and solved. A stronger emphasis should therefore be placed on understanding the effect of anxiety on problem-solving performance of the most able in our society. The literature provides some comparisons between the anxiety levels of gifted children and their non-gifted peers. The research in general suggests that gifted children have the same or lower levels of anxiety when compared with their non-gifted peers

(Milgram, 1976; Reynolds and Bradley, 1983; Davis and Connell, 1985; and Chin Li Tzeng, 1981).

The literature that deals with the gifted supports the notion that gifted children in general are better problem-solvers than is the general population of the non-gifted. (Torrance, 1980; Perrone and Male, 1981; Davidson and Sternberg, 1984).

However, there appears to be no study on the impact of anxiety on the real life problem-solving performance of gifted children. Thus, it is important that this line of investigation be pursued in order to provide a deeper insight into the way in which curricula or special programs for the gifted should be designed. Such a study may result in a better understanding of who are the gifted that will succeed in the specially designed programs, and later become successful problem-solvers in real life. One may reiterate that the main consideration in this exploratory study is the effect of anxiety on the performance of gifted children faced with the problems of daily life.

As was mentioned earlier, the special programs directed to gifted children are many and varied. Most of the programs emphasize the importance of a relaxed atmosphere and avoidance of the tension sometimes occasioned by testing. Situations requiring gifted students to produce solutions even in situations of stress, such as working to strict time limits, being penalized as a result of commitments that were not fulfilled, and taking responsibility for decisions made

etc. have to be studied and evaluated. One may hope that the data from this study will provide a starting point from which to search for effective methods of preparing gifted children to meet the challenges of a complicated and frequently dangerous world. This preparation to cope with life situations should start gradually in the elementary school.

Research Questions

The following questions enable the researcher to investigate more specifically the issues involved in the problem of the effect of anxiety on the problem solving performance of gifted students in Israel. (In Chapter III each of these questions is rephrased as a null research hypothesis).

1. Is there a significant difference in the real life problem-solving performance of gifted and non-gifted groups?

2. Is there a significant difference in real life problem-solving performance by induced anxiety and non-induced anxiety groups?

3. Is there a significant difference in real life problem-solving performance that is produced by the interaction of giftedness and anxiety?

A tangential question concerns the differences in the gender performance of gifted:

4. Is there a significant difference in real life problem-solving performance of gifted girls and gifted boys when anxiety is induced?

Research Hypothesese

1. Gifted children have a better ability to solve real life problems compared with non-gifted children of the same age.

Although the literature reflects many unsolved problems concerning the definition of gifted children and the assessment of their performance, there is a general agreement on their characteristics (Clark, 1983; Howley, Howley and Pendarvis, 1986; Maker, 1982; Rensulli, 1983;). They are considered to be clear and quick thinkers, resourceful, capable of applying induction and deduction in their thinking, and having high motivation for achievement. It seems that these qualities enable the gifted children to function effectively when they are faced with real life problems. Their resourcefulness and their motivation should enable them to find more alternatives as solutions to a given problem than their non-gifted counterparts.

2. Anxiety decreases performance of real life problem solving.

It is reasonable to assume that a person who is in an anxiety state uses part of his energy to cope with his anxiety, and can not devote all his intellectual and mental resources to deal with the problem he is facing. Therefore,

anxiety should decrease performance in solving life problems.

3. An interaction may exist between giftedness and anxiety.

No evidence could be found for this conjecture. Speculations can be confirmed only by a study such as the one investigated here. The question is stated very carefully, and is based on two assumptions: a) gifted children are better problem-solvers compared to non-gifted, and b) gifted children have lower levels of anxiety compared to their non-gifted counterparts (based on reports in part of the research literature: Milgram, 1976; Reynolds and Bradley, 1983). If these two assumptions hold, then perhaps giftedness interacts with anxiety, and consequently produces different results as far as real-life-problem-solving performance under anxiety is concerned.

4. There is a difference in the way gifted boys and gifted girls cope with problems under anxiety.

Based on the findings reported in the literature on gender differences in many areas of life, (Perrone and Male, 1981; O'Tuel, 1989), one tends to questions whethere there exists a gender difference in the way gifted children solve real life problems under anxiety.

Description of Terms as Used in the Present Study

Gifted children

Gifted children referred to in this study, are Israeli children, who:

a) were recommended by their teachers and educational staff as high achievers and as highly motivated students, and

b) were identified as gifted by a battery of tests administered in Israel to third grade students in elementary school, and

c) have received their parents' agreement to be assigned to special gifted classes.

Background information

Interest in special programs for gifted in Israel started in the early seventies. The University of Tel Aviv offered courses in mathematics and physics to young bright high school students. The rationale for offering these courses was the fact that the studies of every Israeli high school student are disrupted at the age of 18 due to the mandatory army service (boys for a minimum of 3 years and girls for a minimum of 2 years of service).

Members of the Mathematics faculty in the University (Prof. Yakimovski and his group) argued that the most fruitful years as far as mathematics is concerned, are those up to the age of 30 (for science, in general, until 35). Therefore, the University should encourage the brightest to develop their talent and avoid disruption of their studies.

The outcome of this program was very encouraging for the students and for the country. Since then the program has continued, having undergone many modifications during the years.

Parallel to the University program, the Israeli Ministry of Education announced its commitment to support programs for the gifted (Burg, 1984). These supported programs were introduced in two cities: Tel-Aviv and Haifa, where classes for gifted children were established. The Department of Education has assigned the task of identifying gifted children to independent research and testing institute (Szold Institute).

This Institute identifies and assigns gifted students to the 4th grade in which programs for the gifted first begin. Ideally, all the students in the 3rd grade should be tested for identification. In practice, due to economic constraints, only 10% of third grade pupils are chosen by their teachers and school principals to take the tests.

According to the institute, 1% to 1.5% from each age group are defined as gifted children (Shafran, 1989).

Not all the gifted students who have been identified participate in the special programs for the gifted. Only those identified, and whose parents provide their consent, are ultimately assigned to gifted classes.

In addition to the classes in Tel-Aviv and Haifa, there are several enrichment centers for gifted children. These centers are located in Holon, Petach-Tikva, and Hertzlia.

In addition there are also pull-out programs offering enriched studies in Jerusalem, Tel-Hai, Kefar-Tavor, Shlomi, and a few other centers where gifted children from the Kibbutz movement are also included. An additional special project for underprivileged gifted children was started in 1985.

It is hoped that the identification process and the gifted programs will continue to develop and generate new ideas based on the knowledge gained from further research in this field.

Anxiety

Anxiety is defined as an uncomfortable emotional state characterized by tension, worry and apprehension. It is a subjective discomfort which is accompanied by physical reactions such as increased heartbeat, perspiration, and shakiness. Anxiety is an unpleasant experience and is an individual response to either internal or external stimulus (Spielberger et al, 1972).

Spielberger and co-workers (1973) developed the ideas of Cattell and Schier (1963) in describing anxiety as an emotion consisting of two constructs: Trait Anxiety and State Anxiety.

Trait Anxiety

Trait Anxiety represents individual differences in characteristic levels of anxiety. It can be considered as the personal potential for experiencing anxiety.

A person with a high level of Trait Anxiety will respond to threatening stimuli more quickly and with higher intensity than an individual with low Trait Anxiety. Such an individual may, therefore, experience more frequently the occurrence of the symptom of anxiety.

The level of Trait Anxiety is determined by the past experience of an individual in anxiety producing situations, and by his ability to manage such situations.

In this study Trait Anxiety was measured by Spielberger's Hebrew version of the Trait Anxiety Inventory for Children (TAI) translated and validated by Taichman and Malink (1984).

State Anxiety

State Anxiety is the manifestation of the anxiety an individual experiences at a given moment.

In this study, Spielberger's Hebrew version, translated and validated by Taichman and Melnik (1984), of State Anxiety Inventory for Children (SAI) was used to measure State Anxiety.

Induction of Anxiety

This term refers to purposely generating anxiety in children. Ethical considerations make drastic induction of anxiety unacceptable. Thus, this study attempted to find a way of combining several normal anxiety-causing situations that exist in the lives of school children. When all of these components are applied simultaneously, the combined effect is substantial, yet acceptable in terms of the anxiety level. A debriefing at the end of the session is a requirement.

The following are components of anxiety which were used in the induction of anxiety:

1. Different from usual classroom environment (Henk M. van de Ploeg, 1984).

2. Unfamiliar administrator of test (Fuchs and Fuchs, 1986; Morris and Davis, 1973).

3. Test Anxiety. (Zeidner, 1988).

4. Personal ramifications of experience. (Gaudry and Speilberger, 1971).

5. Unfamiliarity of purpose and content of situations. (Gaudry and Spielberger, 1971).

6. Inability for advance preparation. (Prystav, 1980).

Manipulation of the combination of situations supposed to cause anxiety was practiced on the treatment groups. The control groups, on the other hand, did not experience this manipulation. Whatever anxiety was experienced was measured by means of the State Anxiety Inventory (SAI).

Strangers

Strangers are considered to be the adults who were unknown to the children. By their sudden appearance and by the role they filled as administrators of the tests to the groups that were assigned to be the treatment groups, they were supposed to generate anxiety. These adults were female students in psychology and counselling in the University of Haifa. They agreed to participate as volunteers in this study. (See: Methodology).

Real Life Problem-Solving

For the purpose of this study Real-Life-Problem-Solving is defined as: a multifaceted process involving the ability to:

a) recognize the issue or issues to be dealt with,

b) elicit relevant and effective solution(s),

c) communicate the solution to others and,

d) provide suggestions how to avoid such a problem.

This ability was measured by the performance of the students on the Real Life Problem Solving Situation Set (RLPSSS) which is described below.

Real-Life-Problem-Solving-Situations-Set (RLPSSS)

A set of stimuli that represent real life dilemmas relating to home, family, school, peers and community was prepared for this study (see: Chapter III, Instrumentations).

This set comprises a selection of situations that were adapted from two North American Real-Life-Problem-Solving tests: 'Purdue Elementary Problem-Solving Test' (PEPSI) (Feldhusen et al, 1976), and 'Test of Problem Solving' (TOPS) (Zachman et al, 1984).

Due to the facts that: a) there is no available Real Life Problem Solving Test in Hebrew, and b) the relevant Real-Life- Problem-Solving tests as PEPSI (1977) and TOPS (1984) had to be translated and adapted to the Israeli culture (see: Chapter III Pilot study), the only practical way of going ahead with the study was to prepare a set of RLPSSS and administer it on a one-time and simultaneous basis to all the groups that participated in the study. (see: Methodology).

Performance Score

Every relevant different idea generated by each of the questions in the RLPSSS is accorded one point. The total of these points, over all the situations, is the subject's performance score. The focus is directed to the variety of different relevant ideas, and does not concern literary style.

The scoring process involves judgement of five judges (see: Methodology).

Limitations And Constraints

The following limitations and constraints apply to this study:

1) Accuracy in identification: The gifted students of this investigation have been identified and selected through the Israeli procedure. The students selected as gifted are essentially those children whom the 'test battery' identified as having the potential to perform well scholastically within the existing regular school curricula. However, following the selection, they are assigned to special classes, in which different curricula are being implemented. There is no guarantee that all those who have been selected really "belong" in these classes, or that the selection process has not failed to identify some of the really gifted. This situation notwithstanding, the system of selection is unlikely, at this point, to be changed and

no other choice was realistically available, as far as the gifted students' population was concerned.

2) **Accessible gifted population:** One should mention that a comparison of several parallel classes from the same age and the same circumstances would likely yield the most reliable data. However, very few classes of the gifted students exist in the entire country. Every city in which such a class is operating applies a different curriculum, and operates in different ways. Consequently, gifted students who were identified by the **same identification process** as applied here and assigned to parallel classes, would not necessarily be comparable in terms of all the relevant criteria.

Therefore, an alternative way of comparing performance of two matched groups of gifted children was considered. This alternative suggested that the whole population of the gifted elementary school children in one city (Haifa) would provide these two matched groups. One which will perform under induced anxiety, and the other which will perform in its regular setting. This population consists of three classes: fourth, fifth, and sixth grades which are located in one elementary school. The justification for using these consecutive three classes is based on:

a) The Israeli "Miltha" Intelligence Group-Tests" (Ortar and Morieli, 1973) which considers these three grades as one unit.

b) Spielberger's (1973) Anxiety Scales: State Trait Anxiety Inventory for Children (STAIC) in which the norms are based on data collected from 4th 5th and 6th elementary school children as one unit.

3) **Ensuring uniformity of behaviour on the part of testing staff**: One has to depend heavily on precise clearly and uniform instructions in order to ensure uniformity of behaviour of the testing staff (teachers and 'strangers'). Inevitably, physique, complexion, type of voice, enunciation, and other distinctive characteristics of personality communicated subtle impressions. In this respect the researcher tried to:

a) choose strangers that would constitute a homogenous group as much as possible. All the 'strangers' were young female senior students in psychology and education.

b) present clear instructions to the teachers and the strangers, so that there was no room for individual improvisation. All of them acted according to written instruction.

4) **Differences in physical setting for induced anxiety:** The problem of working under the same circumstances, at the same time for all the experimental groups, presented serious difficulties, such as arranging for all teachers and strangers to be present at the same time and using simultaneously several rooms. The school did not have six empty extra classrooms. The rooms that were available to serve this purpose were: a) the computer room, b) the

library, c) the teachers' lounge, d) the art room, e) the
science room, and f) the bomb shelter room. Clearly, a
given room with its special setting and atmosphere has an
effect on the anxiety of the children. The only solution to
the problem was to assign the experimental groups randomly
to these available rooms.

5) **Ethical considerations of anxiety induction:** Inducing
anxiety in children obviously can give rise to ethical
problems. Therefore, types of anxiety that were part of the
reality of the students' daily life and that would not
result in any emotion damage to any child were sought in
designing the experimental procedures. An acceptable plan,
used in this study, was to design an anxiety-inducing
situation related to test writing in an unfamiliar room,
administered by a stranger without clearly specifying the
purpose and time limit. Each one of these manipulated
situations was supposed to cause anxiety. Thus, it was
reasonable to assume that all of them occurring
simultaneously would give rise to significant anxiety within
the treatment groups.

One should mention that it is crucial to debrief the
students immediately at the end of the experimental session.
These remarks should disclose the purpose of the study, and
point out that any test results will have no effect on the
future welfare of the students who have participated in the
study. Each of the strangers was well aware of these
ethical issues and carried out the desired debriefing. By

this step and by following the described protocol, the constraining ethical issues were acknowledged.

6) **Lack of a Real Life Problem Solving test in Israel:** It was not possible to find a Real-Life-Problem-Solving Test in Hebrew that would deal with everyday Israeli life situations. Therefore, this researcher was required to prepare an appropriate set of problem-solving situations. It was beyond the scope of this thesis to develop, validate and standardize an Israeli-Problem-Solving Test. However, some relevant 'real-life' problematic situations could be identified in two American problem-solving tests (see Methodology). The relevant situations were adjusted to this study through a pilot study and with the help of professional judges.

As a result of this particular limitation, the research design had to be adjusted. Owing to standardization problems of the RLPSSS, it was not possible to use a pre-post test design for comparison. The simultaneous one-experimental-run appeared to be appropriate for this study.

As this is an exploratory study, albeit one which may suggest new approaches in this area of investigation, there was the need to make a tentative beginning. In this respect, the results obtained through the locally developed RLPSS set were not without merit. It is hoped, however, that continued exploration in this field will result in a more refined Real-Life-Problem-Solving-Situations-Test.

7) **Language:** Finally, the study was carried out in Hebrew. The translation of the students' responses and comments is sometimes complicated owing to cultural differences. Some of the local flavor may therefore have been lost. This fact should also be kept in mind.

Overview of The Present Study

This study is organized into five chapters. Chapter I deals with the immediate concerns. It presents the background, the purpose of the study and its rationale, the general problem, and the research questions. The terms used are described, and the limitations and constraints are dealt with. Chapter II includes the literature review regarding the main areas of interest in the study. Chapter III furnishes a description of the population, the subjects, the variables, instrumentation and procedures used in this study. The research plan, research hypotheses, method of analysis and data processing are also discussed in this chapter. Chapter IV deals with the results and the analysis of the collected data. Chapter V contains a summary of the study, a discussion which is followed by conclusions and educational implications. There are also recommendations for further research.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

The role of education "should center around the ability to solve problems, the kind of problem-solving that requires the individual to be an independent thinker and to strive to achieve his or her own solutions to complex problems." (Olton and Crutchfield, cited by Harris and Blank, 1983, p.130).

The issue of problem-solving has been studied, discussed, and analyzed for many years and in many aspects. The focus of this study is the performance of gifted children when required to solve problems under conditions of anxiety. This review of the literature addresses the issues of problem-solving: definitions, skills, experience, transfer of training, gender differences and motivation to succeed which includes the need to cope with stress. The relationship between stress and anxiety is described by operational approaches to the measurement of anxiety. Studies which deal with anxiety and problem-solving of the general population of children are reported followed by description of another line of studies which deal with anxiety and gifted children.

Problem-Solving

Problem-Solving: Definitions

Dewey (1933) defined problem-solving as:

> **Problem**: A state of doubt, hesitation, perplexity, mental difficulty in which thinking originates.

> **Solving**: an act of searching, hunting, inquiring, to find material that will resolve the doubt, settle and dispose of the perplexity (p.12).

Blank's (1982) definition is:

> "A problem, by definition, exists whenever an individual encounters a purposeful situation which requires resolution by him and for which he has no readily available solution at hand" [p.13].

Wheatley (1984) suggested that problem-solving is what we do when we don't know what to do.

Feldhusen and Treffinger (1985) asserted that:

> "Problem solving is the process of recognizing an obstacle, difficulty, or inability to act; thinking of possible solutions; and testing or evaluating the solutions" [p.48].

Woods (1988), distinguishing between successful and poor problem-solvers, concluded that:

> "Successful problem solvers feel a sense of disequilibrium and identify a need to learn something when they encounter something that does not make sense. Poor learners do not" [p.243].

Problem-Solving Skills

What are the skills that need to be identified for the learner, developed and integrated into his way of thinking, in order for him to become an effective problem solver?

Guilford and Hoepfner, (1971) concluded that there are number of abilities involved in the complete problem-solving process: a) thinking rapidly of several characteristics of a given object or situation, b) classifying objects or ideas, c) perceiving relationships, d) thinking of alternate outcomes, e) listing characteristics of a goal, and f) producing logical solutions.

Blank (1982) suggested that successful problem-solving is the end-product of the interaction of knowledge, ability and motivation.

Sternberg (1984) distinguished between the more intelligent problem-solvers who are reflective and the less intelligent problem-solvers who are impulsive. The reflective problem-solvers tend to spend relatively more time on encoding the problem to facilitate subsequent operations than do the impulsive problem-solvers.

Sternberg (1985) classified thinking skills for problem-solving into three groups: metacomponents, performance components and knowledge acquisition components. Metacomponents include recognizing a problem, defining the problem, deciding on a problem-solving procedure, allocating time and resources, monitoring the solution to the problem, utilizing feedback regarding the solved problem, and forming a mental representation. Performance components are used to

execute the metacomponents and provide feedback. The performance components vary by discipline. Typical performance components include inductive reasoning, deductive reasoning, spatial visualization, and reading. Knowledge acquisition processes are used to learn concepts or procedures. Selective encoding, selective combination, and selective comparisons are typical knowledge acquisition skills.

Treffinger (1986) argued that the roles of convergent and divergent thinking in problem-solving are mutually supportive rather than opposite or competing.

The information processing theory of problem-solving has centered around two major methods a) computer simulations and b) think-aloud protocols (Simon, 1981). These methods have been used to provide a match between skills performed by a model as it used to solve a problem and data from human subjects performing a task. This research is referred to as: "information-processing theory", because it does not seek only to examine the products of thinking, but also the processes which underlie and generate these products.

Problem-Solving: Experience

Vygotsky (1978) pointed out the role of experience in problem-solving. He stated that children first experience problem-solving activities in the presence of others, then gradually come to perform these functions for themselves. An early experience of failure can seriously affect their later performance on problem-solving. Children's objective knowledge of their own cognitive processes is influenced by their feelings of personal worth.

Simon and Barenfeld (1979) concluded that many problem solvers are able to store in memory the paths to solution for many problems. When facing a problem they refer to past success in problem-solving and to heuristics that have been learned. In this way past experience has to be repeated and restructured to meet the current demands of the new problem which is calling for solution.

This issue leads to the question of whether the teaching of problem-solving can result in transfer of training to better performance on other problems.

Problem-Solving: Transfer of Training

Different studies conducted by Houtz and Feldhusen (1976, 1977), by Harris and Blank (1983) and by Cramond, Martin and Shaw (1990) indicated that training in problem-solving resulted in significantly better performance. Houts and Feldhusen (1976, 1977) examined the effects of a problem-solving training program. They divided 240 fourth

graders into 3 groups: a) training plus rewards with free time and games, b) training only, and c) control group who took part in regular class activities. There was a significant effect for the experimental groups, where the training-only group performed much better than the others on problem-solving test. The researchers also administered a 'transfer test' which presented similar problems to those in the training. In this test, the training-only group also performed significantly better than the others.

Harris and Blank (1983) used Blank's Creative Problem-Solving Program to determine deficits in several abilities for fifth-grade students. They used the Productive Thinking Program (PTP) materials, (revised version, 1972), and concluded (in contrast to former findings by Ripple and Dacey, 1967, cited in their paper), that transfer of training was found. "Our study found strong support for the ability of the PTP to train for transfer of fluency in real life problems which transcend particular kinds of problems of subject matter" [p.147].

Whimbey, (1980) asserted that expert problem-solvers' concern for accuracy causes them to take great care in understanding the problem in order to facilitate the choice of appropriate procedures to solution. He suggested that one course in problem-solving is not enough, and that it should be reinforced throughout the curriculum in order for transfer to occur.

Torrance (1980) discussed near and far transfer. Skills learned for one task and transferred to a different task are considered to be near, if the new task is similar in its underlying principles. However, if the conditions are substantially novel, the transfer is considered to be far.

Sternberg (1986) asserted, based on his experiments, that students can improve their skills through problem-solving tasks and can transfer these skills to new problems. According to his experiments the improvement of problem-solving skills and the transfer was still evident a year later. Sternberg (1983) claimed, according to the results of his experiments, that better transfer occurs when one moves from practice on intermediate problem-solving to work on larger problem-solving, than if one starts with small problem-solving tasks. However, he found that context did not affect transfer.

Problem-Solving: Strategies

Parnes (1967) suggested five stages for problem-solving: a) gathering information about the "mess", b) formulating a problem definition, c) generating ideas, d) manipulation of the best ideas into a solution strategy, e) implementation of the "chosen ideas".

Newell and Simon (1972) stated that a subject's behavior is a function of an interaction between the task environment demanding a solution and the subject's individual abilities. They concluded that there is a general problem-solving process that cuts across a large class of problems. The process of problem-solving begins with an internal representation of the problem. This representation may render problem-solutions as obvious, obscure, or perhaps unattainable. The system then responds by selecting and applying a particular problem-solving method, a method which bears some rational relationship to achieving a solution. Newell and Simon (1972) stated that:

> at any moment, the execution of the method may be halted. When a method is terminated, three options are open to the problem-solver: a) another method may be attempted; b) a different internal representation may be selected and the problem reformulated; or c) the attempt to solve the problem may be abandoned (p.88).

Adams (1976) claims:

> the natural tendency in problem-solving is to perceivew the first solution that comes to mind and run with it. The disadvantage of this approach is that you may runw either off a cliff or into a worse problem than youw started with. A better strategy in solving problemsw is to detect the most attractive path from many ideasw or concepts (p.xi).

Feldhusen and Treffinger (1985) mentioned five steps in problems-solving which they related to critical thinking:

a) recognizing problems,

b) formulating hypotheses,

c) gathering pertinent facts of data,

d) drawing conclusions.

Khatena (1984) reviewed the main problem-solving models that included the works of: Dewey, Wallas, Rossman, Guilford, Osborn, Gordon and Prince, Osborn and Parnes, Torrance and de Bono. All those models differed in the number of steps involved in the problem-solving process. Khatena integrated them into four main steps: a) Sensing and defining the problem, b) Preparation, c) Processing mechanism, and d) Finding a solution to the problem.

Problem-Solving: Gender Differences

The central two questions concerning gender differences in problem-solving are whether there is a difference between the sexes, and if there is, is it a difference in ability or in attitude.

Gender differences in problem-solving were examined by Maccoly and Jacklin (1974). They stated that girls learn a more global style of problem-solving, while boys learn to solve problems analytically. O'Tuel (1989) studied 300 gifted students' scores on the Gifted Screening form SOI-LA. (This screening form: Structure of Intellect Learning Abilities, is used often as an instrument for screening

students for programs for the gifted). She found that females performed better on various verbal tasks, and males performed better on a figural subtests. This study dealt with 4th, 7th, and 10th grades. The main question of this study was the continuing use of this identification instrument which does not address equally the subjects being identified through it.

Cramer (1989) checked the sex differences and stereotypes in a study with gifted 4th grade students. The study focused on attitudes of gifted boys and gifted girls towards mathematics. The finding suggested that there is a stereotypical thinking regarding the lower ability of females in mathematics.

Perrone and Male (1981) claimed that boys considered their accomplishments to be a result of their ability and efforts, while girls attributed their success to external circumstances, such as good luck, easy assignment, teachers' favorite etc. They also discussed the "fear of success" syndrome in some females. Perrone and Male claimed that these girls felt that high achievements would reflect negatively on their femininity. This feeling was not found in males.

Another study conducted by Karnes and D'Ilio (1989) with gifted children in the 4th, 5th and 6th grades, regarding attitudes towards leadership, concluded that the responses of the boys were more traditional than were those of the girls.

Bell (1989) focused on the gifted girls' (grades 3-6) dilemmas, which may block their success. In a project entitled REACH that was designed to explore internal barriers to achievement, she interviewed the gifted girls. Some of the dilemmas she discussed were: Smart vs Social, Silent vs Bragging, Passive vs Aggressive. According to Bell, society communicates double message to gifted girls: on the one hand it expects them to achieve academically with high standards, and on the other hand, it expects them to pursue the traditional feminine role. Therefore, whatever the gifted girl does, she cannot win.

Giftedness

> Giftedness is a biologically rooted concept, a labelw for high level of intelligence that results from thew advanced and accelerated integration of functionsw within the brain, including physical sensing, emotions, cognition and intuition. Such advanced and acceleratedw function may be expressed through abilities such asw those involved in cognition, creativity, academicw aptitude, leadership or visual and performing artsw (Clark, 1983, p.6).

There are many other definitions of 'giftedness', in which additional aspects such as motivation (Renzulli, 1978), insight (Sternberg and Davidson, 1986) and learning style (Shore and Dover, 1987) are addressed. The definition that seems to be most relevant to the discussion about gifted children and real life problem solving was proposed by Tennenbaum (1991). He referred giftedness to those children who are producers of new ideas, not necessarily the

fast learners. In facing real life problems one has to come out with new ideas relevant to the specific situation.

Gifted children: Problem-Solving

Gallagher (1975) discussed the need of problem solving programs for the gifted children in order to challenge their cognitive ability.

Rosenfield and Houtz (1977) compared scores on the problem-solving of non-gifted children with those of the gifted and concluded that gifted subjects were approximately two years ahead of the non-gifted. They found that problem-solving skills grew steadily from grade two through grade six.

Chatman and Williford (cited by Shore and Dover, 1987) designed research to determine whether fourth grade gifted students used a particular strategy in their problem-solving activities. These authors used an unstructured interview to assess awareness and use of cognitive strategies while solving problems.@None of the gifted students could verbalize their thought processes. Only few students reported using certain strategies.

Davidson and Sternberg (1984) discussed insight skills in concern with giftedness. They proposed a subtheory that there are three psychological processes: a) selective incoding, b) selective combination, and c) selective comparison which are referred to as "insights" when basic clues are encoded, combined or compared in non standard new

ways. Their theory was tested with 4th, 5th and 6th grades of gifted and non-gifted children. They concluded, based on a training program, that the insight skills are somewhat trainable. Shore and Dover (1987) mentioned Dover's comparison between gifted and nongifted 5th and 6th in which he concluded that gifted outperformed nongifted in their problem solving skills.

Cramond, Martin and Shaw (1990) trained three groups of gifted students (grades 6th, 7th and 8th) in Creative Problem-Solving (CPS). One group received traditional CPS training, the second received the same training with additional transfer strategies infused (CPST), and the third was the control group which received training in various memory tasks, exercises in logic, and analogical skills. The results indicated that the CPST subjects had the highest percentage of students who applied the strategies on new tasks of problem-solving, next was the CPS group, while the third had the lowest percentage of students who were able to transfer their training to another problem-solving task.

Giftedness: Motivation and Problem-Solving

Galton (1962) considered giftedness as a quality of effort and talent. This logic was carried out many years later by Renzulli.

Renzulli (1978) included the component of motivation in his definition of giftedness. He referred to it as 'task commitment' that is shown by: a) persistence in

accomplishment of goals, b) integration of diverse goals, and c) self confidence, freedom from inferiority feelings, drive to achieve, and eagerness. "Productive persons are distinguished from less productive persons by showing more of these qualities" [p.182].

Whitmore (1980) stated that motivation and effort are concomitants of talent development, not pre-requisites. Chang (1985) distinguished between the intellectually able and the high achieving gifted by their attitude, their depth of interest, their enthusiasm, and the way in which they strive to study any subject.

However, no one ignores that the combination of motivation and talent enable higher achievement than just having talent without motivation and vice versa.

Torrance (1980) presented a composite image of the productive, gifted and talented individual as one who has developed a personalized wisdom about life. Such a person recognizes that departing from tradition may invite distress, but is willing to accept a certain amount of stress in the belief that a new order will be created.

Perrone and Male (1981) concluded, following their study of eminent people, that the common denominator uniting them all was their motivation to know and to be productive. This finding reinforced the claim of Atkinson and Feather (1966) that the motive to succeed and the motive to avoid failure are different but equally powerful. Persons driven by a motive to succeed are likely to take risks when they

perceive that there is a reasonable chance of succeeding. Persons motivated by a fear of failure are unlikely to take risks; they prefer tasks in which they are certain to succeed or are expected not to fail.

Milgram (1976) also emphasized that success striving and failure avoidance are different motives...... "effecting successful outcomes versus averting failure outcomes are different motivational expectancies" [p.192].

The fear of failure and the striving for success are both characterized by coping with stress and anxiety. What then is meant by stress and anxiety?

Anxiety

Stress and Anxiety

There is no agreement about the terminology to use when referring to stress. Anxiety, conflict, frustration, defense, fear, and threat are used interchangeably (Lazarus, 1966; Schafer, 1978; Spielberger, 1972). The terminology used and the many definitions of stress may well be sources of confusion.

Torrance (1965), Cox (1978), Schafer (1978), Antonovsky (1979), Selye (1983), and Thorensen and Eagleston (1983) agreed that certain amount of stress improves performance, while intense stress may result in serious deterioration of performance.

Trumbull (1976) viewed the relationship between stress and anxiety in terms of the end results of stress. The

individual's perception of the stress is called threat, and his or her subsequent response may be anxiety (Spielberger, 1972, 1976).

Spielberger (1972) developed his State-Trait Anxiety theory which is concerned with:

> Clarifying the properties of A-State and A-Trait
> aswpsychological constructs, and with specifying
> thewcharacteristics of stressful stimulus conditions
> whichwevoke differential levels of A-State in persons
> whowdiffer in A-Trait (p. 42).

Spielberger referred to State Anxiety as: "a transitory emotional state or condition of the human organism that varies in intensity and fluctuates over time" [p.39], and to Trait Anxiety as: "relatively stable individual differences in anxiety proneness" [p.39].

Wallach and Kogan (1965) reviewed the literature on children's anxiety by: Sarason, Davidson, Lighthall, Waite and Ruebush, (cited in their book). They pointed out that

> the majority of specific fears reported by
> childrenwhave little or no basis in reality.these
> specific fears seem to serve as focal points or screens
> forwanxiety about situations, impulses, and
> conflictswwhich possess extremely dangerous
> implications for thewchild's security (p.190).

Anxiety: Operational Approaches

Two operational approaches concerning the anxiety variable in children are described below:

a) The Children's Manifest Anxiety Scale: this scale was basically derived from Taylor's (1953) anxiety scale for adults. Castaneda, Palermo and McCandess (1956) selected the items that seemed to be appropriate for children. This Children's scale was said to measure the child's general level of anxiety.

b) The General Anxiety Scale for Children (GASC): derived by Sarason et al. (1960). The items selected in this scale are compatible with the Freudian conception of children's anxiety. Freud (1936) (cited in Wallach and Kogan, 1965) defined anxiety as a state that is perceived as basically unpleasant, with physiological concomitants often present. Item content of GASC reflected situations that might elicit anxiety, such as sight of blood, parental absence, etc. In addition to this scale Sarason et al. (1960) developed also a Test Anxiety Scale for Children (TASC).

Wallach and Kogan (1965) in their studies used Sarason's General Anxiety (GASC) and Test Anxiety scales (TASC). They changed the interrogative form from second person to first person (for example, "Do you worry that you might get hurt in some accident?" was rephrased as: "I worry that I might get hurt in some accident"). They also omitted some items in order to minimize redundancies in content.

This modification of the General Anxiety and Test Anxiety scales (GASC and TASC) was translated into Hebrew and validated in Israel (Ortar, 1973). Internal analyses of both scales including item score correlations and split-half reliabilities, yielded highly satisfactory results including Kuder-Richardson correlation coefficients of 0.76 and 0.82, respectively (Milgram, 1976).

The translated scales were used in a study that compared levels of anxiety of gifted children vs non-gifted (Milgram, 1976) in Israel. Milgram found that gifted children in elementary school have a lower level of anxiety compared with non-gifted children of the same age.

Anxiety: Problem-solving

The issue of children's anxiety is dealt with over a period of three decades. (Sarason, 1960; Wallach and Kogan, 1965;). The literature provides studies on the influence of anxiety on the problem-solving performance of children. Some of the relevant studies are presented below.

West (1969) found that anxiety interacts with irrelevant information to produce a difficult situation for the problem-solver. Research by Nottelman (1975), carried out with 4th and 5th grades, concluded that highly anxious children engaged significantly more in off-task behaviors than less anxious children.

Gross (1984) reported on two experiments that he performed in a private elementary school with 2nd and 6th grade children, investigating relationships among state

anxiety, memory processes, and children's performance on problem-solving tasks. His conclusion was that little performance deficit resulted from high state-anxiety.

Schill (1984) compared the coping behaviors of stressed low anxious subjects with those of high anxious subjects, and found that the low anxious subjects dealt with life stress primarily by trying to analyze specific problems and taking direct action. The highly anxious stopped functioning well,@@sought the support of others and, if male, resorted to drugs, alcohol or sex as a source of comfort.

Sieber (1970) discussed the facilitating effects of anxiety as well as the disruptive effects. She presented a paradigm that can provide information on the ways in which learning environments can be modified to take advantage of the facilitating effects of anxiety and eliminate its disruptive effects.

Zeidner et al. (1988) dealt with the test anxiety of Israeli fifth and sixth graders. They trained teachers to improve students' test coping skills. As a result the students' performance improved. However, the improvement on test anxiety scores was negligibly affected.

Anxiety: gifted vs. non-gifted children

The comparison of anxiety level of gifted vs non-gifted children is central to a basic controversial issue in the field of gifted children.

There are two different views that are supported partially by research and partially by opinion "based on experience". One point of view emphasizes the fact that the gifted children have higher anxiety compared with the non-gifted.@This view was expressed by Dirkes (1983) who stated:

> that the condition of giftedness is fertile ground forwanxiety cannot be denied...since the abilities of thewgifted are out of step with age peers and often surpasswtheir elders, they upset customary relationships andwinvite ambiguous expectations for performance...Thewanxiety that results is proportional to the support orwrejection that they experience in response to theirwuniqueness and initiative (p.68).

This view, however, was not supported by other researchers, as Milgram (1976), Reynolds and Bradley (1983), and others who found that gifted children exhibited less anxiety compared with non-gifted. A substantial sample of the published relevant literature is presented below. However, it should be mentioned that the topic of gifted children and their level of anxiety is very general, and has not yielded a comprehensive theory. There is much vagueness in the literature concerning this issue, and many of the conclusions are expressions of opinion, not based on research at all.

The first line of research will emphasize the fact that gifted children have more fears and are more pessimistic than non-gifted children. Clark and Hankins (1985) found that at ages 6 - 10, gifted children, compared with their non-gifted counterparts, were more worried about their education and about the political situation. It should be

mentioned that the comparison was based on the subjects' answers to 19 questions regarding the philosophical concerns characterizing intellectually gifted children. The answers to the questionnaire were analyzed and the consequences presented.

Galbraith (1985) **interviewed** gifted students and found that 80% of the interviewed gifted children were concerned with threats of nuclear war,@@international relationships and global economic problems. According to Galbraith, these children's concerns were accompanied by strong feeling of helplessness. They felt that no one explained to them what being gifted is all about, that kids often teased them about being smart, and that parents, teachers and friends expected them to be perfect. They felt overwhelmed by the number of things they can do in life, and they also worried about world problems, and felt helpless to do anything about them. These findings support previous reports by Landau (1976, Israel) and George and Gallagher (1978, USA)@@that gifted children experience feeling of helplessness and pessimism while worrying about their future and the future of the world.

Roeper (1982), based on her broad experience with gifted children, mentioned the following characteristics and circumstances that might account for these feelings of the gifted: The perfectionist, the child/adult, the winner of the competition, the exception, the self critic and the well

integrated child. All those characteristics may involve anxiety.

A study carried out in Canada by Forsyth (1987), which compared French immersion gifted classes with regular classes on anxiety and self-concepts (using the State-Trait Anxiety Inventory For Children as an anxiety measure), found that gifted students, particularly girls, demonstrated the highest anxiety.

The issue of identifying the specific fears of gifted students is discussed in the study by Derevensky and Coleman (1989). Their findings indicated that the four most common fears mentioned by the gifted were: nuclear war (58.6%), violence (55.7%), miscellaneous, which included anything from lack of social life to getting pregnant (47.1%), and death/disease (40%). This study was also conducted in Canada.

The line of research which supports the opposing argument that gifted children have more self-confidence and a lower level of anxiety than their non-gifted counterparts is presented below.

Reynolds and Bradley (1983) revised the Children's Manifest Anxiety Scale (CMAS; Casteneda, Palermo and McCandless, 1956) and administered it to groups of gifted vs non-gifted (second grade to twelfth grade). They found that the gifted sample (465 children) displayed a lower level of anxiety than the non-gifted sample (329 children).

Scholwinski and Reynolds (1985), with the Revised Children's Manifest Anxiety Scale (RCMAS), found again that high IQ children exhibited lower levels of anxiety. This lower anxiety level characterized the high IQ group on all variables that emerged through their factor analysis. Davis and Connell (1985), in their study with 4th, 5th and 6th grade gifted vs non-gifted, found that "gifted report less anxiety about their school performance than average students and a greater willingness to take on challenging tasks, and to independently solve difficult problems" [p.134].

Several interesting studies were carried out in Taiwan (Republic of China). Wu-Tien (1981) used an adaptation of the Sarason (GASC) for Chinese children (GASCC) and the Test Anxiety Scale for Chinese Children (TASCC). He compared the anxiety level of 611 gifted children in 3rd, 4th and 5th grades who were assigned to special gifted classes with their gifted peers who had not withdrawn from regular classes. He reported that the gifted in special classes were emotionally more stable, felt more confident and secure and less anxious in general life situations.

Hai Chig Lin (1981) compared gifted with non-gifted 4th and 5th grades. He used a total of 233 children and an adaptation of Sarason's General Anxiety and Test Anxiety scales in Chinese (General Anxiety Scale for Chinese Children GASCC and Test Anxiety Scale for Chinese Children (TASCC), and the Chinese Children's Manifest Anxiety Scale

(CCMAS) an adaptation of (CMAS). No significant difference was detected between the 2 groups on all 3 anxiety scales.

Wen Chi Liu (1981) compared gifted with IQ above 146 with average children, using a total of 100 primary school pupils from 1st grade to 3rd grade. The Test Anxiety scale (TASCC) was used. In this study, too, no significant difference was found between the 2 groups.

Chin-Li Tzeng et al (1981) also used the GASCC and TASCC scales and compared anxiety levels of gifted and non-gifted Chinese children at the 4th and 5th grades using a total of 147 subjects. Here also, a lack of significant difference between the 2 groups was reported, but it was noted that the scores on anxiety were significantly lower for boys than for girls.

Milgram (1976) reported that according to the General Anxiety Scale, Israeli gifted were found to have a lower level of anxiety as compared with the non-gifted, and boys were found to have a lower level of anxiety than did girls. Gifted girls were found to be less anxious than non-gifted girls, while no significant differences were found between gifted and non-gifted boys. The differences between boys and girls among gifted children did not reach statistical significance. Milgram's reports on the Test Anxiety Scale were also similar. Gifted were less anxious than non-gifted and boys less anxious than girls. In addition, it was found that with increasing age, (the study was conducted with

grades 4-8), boys expressed less anxiety and girls reported more.

Roome and Romney (1985) explored the possibility of reducing anxiety by inducing relaxation. They found that biofeedback and muscle relaxation influenced the subject towards more internal locus of control when compared with a non-treatment group. However, there was no change in trait anxiety. They argued against the supposition that gifted children in general are more anxious than non-gifted children.

Many of these studies were criticized for the way they measured anxiety, which may be subject to manipulation.

Some studies that tried to avoid this problem reached, however, the same conclusion. Ludwig and Cullinan (1984) compared elementary gifted students with non-gifted students on a teacher-rating scale. They found that the gifted were perceived by their teachers as less anxious and exhibit fewer behavioural problems than did their non-gifted counterparts.

A study conducted by Wooding and Bingham (1988) in three junior high schools in Calgary Canada, compared the reaction of gifted vs non-gifted to a cognitive stressor. The researchers concluded that the gifted reaction to a cognitive stressor was less intensive than that of their non-gifted subjects, and their recovery was more rapid than that of the non-gifted.

Conclusion: Problem-Solving / Gifted children / Anxiety

As was demonstrated in this chapter, the literature deals broadly with the issues of problem-solving (definitions, skills, experience, transfer of training, strategies). The focus on motivation in problem-solving leads to a comparison between non-gifted who work under the motivation of avoiding failure and the gifted who are striving for success, (Perrone and Male, 1981). The motivation either to avoid failure or to achieve success generates stress. The way the individual perceives the stress is considered as anxiety, and is measured by anxiety scales, (Spielberger, 1973).

The research design and instrumentation of all the studies mentioned in this chapter were different and therefore cannot be compared. Any such comparison may provide vague outcomes of over-generalization.

The present study focuses on the effect anxiety has on the problem-solving performance of gifted children when confronted with real life problems. It seems that this core topic in the education of the gifted is still not explored enough and there is an urgent need for a thorough understanding of its implications.

Only one reference has been found concerning this issue. This reference is the article by Dirks (1983). She argues that gifted individuals learn to use anxiety to advantage, and they respond to conflict by integrating their uniqueness in an effort to find appropriate strategies to

deal with problem-solving. However, no substantial research was found concerning the effects of anxiety on the real life problem-solving performance of gifted children.

In view of the information provided in the literature, and more so the information that is missing in the literature, it is hoped that this study is opening a new line of research that may provide some answers regarding the problems involved with the performance of gifted children under conditions of anxiety when they are faced with real life problems. The description of the methodology of this study is presented in chapter III.

CHAPTER III

METHODOLOGY

This chapter includes a description of the population, the subjects, the variables, instrumentation and procedures used in this study. Included is the research plan which comprised a pilot study and the main study, data processing, research hypotheses and method of analysis regarding anxiety and real life problem solving.

POPULATION

Target Population:

The target population of this study refers to the elementary school gifted students in Israel. The agreed upon qualities of intellectually gifted children, in general terms, refer to children who achieve at a higher level of performance scholastically, who think more clearly, process information more effectively, and demonstrate more insight than do average children (Feldhusen and Treffinger 1985; Gardner, 1983; Renzulli, 1978; Sternberg, 1986).

Most of the technologically advanced countries have their own criteria for identifying the gifted. In Israel, the process of selection is applied nationally, as described in chapter I.

Accessible Population

The criteria for selecting gifted students and assigning them to special classes are essentially the same for all Israeli students. Curricula, however, differ from one city to another. Consequently it seemed to be most appropriate, for the purpose of this study, to focus on the entire gifted population of one city.

The accessible population that was chosen for this study comprised of gifted fourth, fifth and sixth grades in Haifa, Israel.

The justification for utilizing these three consecutive grade levels as one unit, for research purposes, was based on two major references: a) Spielberger's anxiety inventories for children, TAI and SAI, which are used in the present study, were validated with the fourth, fifth and sixth grades. b) Israeli Intelligence Group Tests, developed by Ortar and Morieli. (Milta Intelligent Test published by the Hebrew University and the Ministry of Education of Israel). These tests have been administered to all Israeli children since 1966, with the fourth, fifth and sixth grade levels constituting one administrative unit.

Background Information:

Some background information about Haifa's public schools population provided by the Psychological Service of Haifa is given below:

The total population of elementary public school (First to Sixth grades) in Haifa, consists of 18,097 students.

The total number of the Fourth grade students is 2,250. The gifted Fourth grade class consists of 24 students (18 boys and 6 girls).

The total number of Fifth grade students consists of 2,350. The gifted Fifth grade class consists of 27 students (18 boys and 9 girls).

The total number of Sixth grade students is 2,450. The gifted Sixth grade class consists of 26 students (18 boys and 8 girls).

As noted above, the selection procedures are similar throughout Israel, and it is reasonable to claim, therefore, that the accessible population of Haifa is typical of the entire country.

Selection of the research groups

The two groups selected for this study were:

1. The entire population of gifted students in grades 4, 5, and 6 enrolled in the special classes for the gifted in Haifa, Israel.

2. Randomly selected classes of Non-gifted students from grades 4, 5 and 6.

There was one class at each grade level containing students classified as gifted, and three classes at each grade level in which the students not classified as gifted were enrolled. From nine classes of non-gifted students only one at each grade level was randomly selected. Each of the three classes in each of the population (gifted and non-gifted) was divided into two groups: treatment and non-treatment matched for Trait anxiety, gender and school achievement. These two matched groups were randomly assigned to treatment and non-treatment groups.

The actual participation of students in the experiment depended on their school attendance on that day. It should be mentioned that because of matching, the results of the students whose assigned pairs did not attend school on that day had to be dropped from the study.

The final number of gifted students participating in the study was: fourth grade: N=24, fifth grade: N=22 and sixth grade: N=24. Total of 70 gifted students (48 boys and 22 girls).

The final number of non-gifted students participation in the study was: fourth grade: N=24, fifth grade: N=28, and sixth grade: N=20. Total of 72 non-gifted students (38 boys and 34 girls).

Variables:

This study, being essentially concerned with the performance of gifted students in relation to non-gifted students in real life problem-solving, under condition of anxiety, employed the following variables:

Independent Variables:

1. **Treatment:** The treatment variable refer to the inducing of anxiety, an intervention which represents an essential consideration in assessing problem-solving performance for this study.

2. **Non-treatment:** The Non-treatment variable refers to the absence of induced anxiety.

3. **Giftedness:** refers to the special qualities found in gifted children who have been identified and assigned to special classes.

4. **Non-giftedness:** refers to children in the regular classes who were not identified as gifted.

5. **Gender:** refers to the difference between boys and girls participating in the study.

Dependent Variables

1. **Anxiety:** as measured by Trait Anxiety Inventory (TAI) and State Anxiety Inventory (SAI) (Spielberger, 1973).

2. **Real Life Problem Solving Performance:** as measured by Real Life Problem Solving Situation Set (RLPSSS). This set presents a series of sixteen conflict situations. The subject is required to identify the problem(s), to suggest solutions, and to find ways in which the problem could have been avoided (see: Instrumentation).

Instrumentation

The instruments used to obtain measures on the variables in this study were:

Trait Anxiety Inventory (TAI) for Children.

State Anxiety Inventory (SAI) for Children.

Real Life Problem Solving Situation Set (RLPSSS).

Anxiety Inventories

Spielberger et al., (1973) developed questionnaires to measure State and Trait Anxiety for Children (STAIC). The items were adjusted to the level of children for aspects such as language and experience. A three-category response format ranging from low to high was designed for children, rather than the four category format in the questionnaire for adults.

The concurrent validity of the TAIC was based on its correlation with Children's Manifest Anxiety Scale (CMAS) (Castaneda et al., 1956) and, General Anxiety Scale for

Children (Sarason, et al., 1960), two well established and widely used anxiety measures. In a sample of 75 children from 4th, 5th and 6th grade the STAIC trait scale correlated .75 with CMAS and .63 with the GASC.

Trait Anxiety Inventory (TAI) for Children:

The TAI measures the subjects' general state of anxiety. It consists of 20 items which Spielberger describes as relating to "relatively stable individual differences in anxiety proneness" (Spielberger, 1973, p. 39).

The subjects are asked to respond to the items according to how they feel in general. The items require self-description.

The alpha reliability of the TAI scale computed for a sample of 456 male and 457 females from 4th, 5th and 6th grades by Kuder-Richardson formula 20, as modified by Cronbach (1950), was .78 for males and .81 for females.

Spielberger's Inventories were translated into Hebrew by Taichman and Malinek (1984), of Tel-Aviv University. The concurrent validity was based on correlation of the translated version with another well-established anxiety Israeli test for children, (Ziv, Levin and Israeli, 1974). This correlation was found to be .65 for a sample of N=237 6th - 8th grades.

The alpha reliability of the Hebrew TAI scale for children was computed for a sample N=237 6th-8th and was

found to be .84 (Male N=113, alpha=.85, and Female N=124, alpha=.82).

State Anxiety Inventory (SAI) for Children

The SAI was also developed by Spielberger (1973). This instrument of 20 items evaluates how the subject feels "right now, at this moment". Scores on the SAI increase in response to physical danger and psychological stress.

Subjects are asked to describe their feelings at the time they are responding to the questionnaire. The items are focused on emotional description. Characteristics that directly relate to anxiety, such as tension, worry, and nervousness, are represented.

The alpha reliability of SAI was computed with a sample of 456 males and 457 females of 4th, 5th and 6th grades. It was found to be .82 for males and .87 for females (Kuder-Richardson formula 20 as modified by Cronbach).

The Taichman and Malinek Hebrew version was also used. The concurrent validity was examined by means of the correlation with an Israeli Anxiety test for children, (Ziv, Levin and Israeli, 1974). The correlation for a sample of 6th-8th grades N=235 was .45.

The alpha reliability was computed with a sample of N=237 6th-8th grades. Cronbach's reliability coefficient was .89 (Male N=113, alpha=.87 and Female N=124, alpha =.90).

Correlation between TAI and SAI

The correlation between the TAI and SAI was a consideration in the development and validation of the two inventories. A very high correlation would show that the TAI is predictive of the SAI. This should not be so, as the SAI varies from situation to situation. Thus, the two inventories should not be measuring the same kind of anxiety. However, if the correlation between the TAI and SAI is too low, this would mean that there is little or no relationship between the constructs. Therefore, the moderate correlation of 0.45 is an important characteristic of the inventories (Spielberger, et al. 1980).

The TAI and SAI have been translated into 27 languages, including Hebrew. It has also proved to be a useful instrument in cross-cultural research. The adaptation of the inventories to Hebrew was done with the cooperation of Spielberger and Diaz-Guerrero (1976), who dealt with the problem of cross-cultural anxiety. (For the complete inventories, in English and in Hebrew, see Appendix A).

Administration of TAI and SAI:

Each inventory was administered under the following standard conditions:
- the subject must answer each item by himself.
- there is no set time limit.
- the Inventory may be used in either a group or individual setting.

- the Inventory was presented as a means of self-
  evaluation, and the word anxiety was not used.

- the specific directions were written on the front
  page of the Inventory.

- With students of elementary school age, it is
  recommended that the administrator will:

a) read the directions aloud while the students follow, and

b) will be available during the entire response session.

If any subject is unclear about an item, the administrator should not explain, but rather reread the item and say:

Answer how you feel generally (for TAI).

Answer how you feel right now (for SAI).

Real Life Problem Solving Measure (RLPSSS)

A real life problem solving test was not found in Israel. (See: Limitations and Constraints). In order to resolve this "real-life-problem" for the current study, items from: 1) PEPSI: "Purdue Elementary Problem-Solving Inventory" (Feldhusen et. al, 1977), and 2) TOPS: "Test of Problem-Solving" (Zachman, Jorgensen, Huisingh and Barrett, 1984) were adapted to create the necessary problems.

The adaptation of the relevant situations in the above tests to the everyday reality of Israeli life was undertaken with the help of two psychologists, one school counselor, and three English teachers. The adapted situations were used in a pilot study which is discussed below. The process of

selecting, translating and adapting, and then choosing the most appropriate situations for this study resulted in a set that is referred to as Real Life Problem Solving Situations Set (RLPSSS). The final RLPSSS is a set of selected sixteen situations that served to be suitable for this study.

The only purpose for using the RLPSSS was to compare the performances of students working under the effects of anxiety with those working under "normal" conditions. The RLPSSS was administered, therefore, only once and at the same time to both the treatment and non-treatment groups.

The RLPSSS development involved several activities which are described below:

a) The questions in the fifteen situations taken from TOPS (1984) were translated from English to Hebrew and checked by three local experts (mainly Israeli English teachers with mastery of both languages). Their input was incorporated in the translation. These situations were assembled into a set mainly for presentation as a pilot study.

b) Fifteen other situations from PEPSI (1982) were adjusted to deal with Israeli-real life relevant problems. The questions pertaining to each situation were written by the researcher in order to ensure consistency with the questions created from TOPS, and their relevance to Israeli children.

Some questions were "creatively" adapted. Others, however, had to be totally new. Two of the illustrations

were also modified. (In the final set: Situation number 3 and 15) (See Appendix B).

c) The two translated sets were administered in grades 4th, 5th, and 6th in a neighboring school as a Pilot Study (described below).

d) The most discriminating situations were selected for the final set. This was achieved by recording the number of different ideas provided by the students for each situation. The final RLPSSS consisted in 16 situations.

e) All the chosen situations' pictures were placed in a box for drawing, and their ordering in the final format of RLPSSS was thus randomly assigned.

Research Plan

The research plan consisted of two consecutive sub-studies: the Pilot Study and the Main study.

I. Pilot Study

A pilot study was conducted with three non-gifted, 4th, 5th, and 6th grade classes (N=93). The classes contained some children identified as gifted whose parents had chosen not to enroll them in any form of special program for the gifted, and thus these classes represented a reasonably heterogeneous group. The school chosen for the pilot study was located in the same middle-class neighborhood of Haifa targeted for the main study.

The reasons for conducting the pilot study were:

a) The student's responses to the items were to be used to evaluate the effectiveness of the individual situations, and thus to aid in the identification of the most discriminating situations for the actual main study.

b) The time-duration required for the subjects to respond to the 15 situations was recorded in order to determine upon the actual time-framework for the main study.

c) By a trial administration of Real Life Problem Ssolving Situations Sets, the researcher was able to determine possible difficulties that might be associated with the administration of these situations.

d) Unexpected organizational difficulties associated with staff and students could be identified during the pilot study and remedied later in the main study.

The pilot study was carried out with the three classes simultaneously in their home-rooms. The teachers in each class handed out the sets, randomly dividing the Hebrew version of TOPS and PEPSI. Both sets contained the same instructions. The sets were presented to the students as a fun task which would not be graded. The students were asked, however, to try their hardest. The teacher read the directions out loud as the students followed the text silently. When each student had finished, he/she brought the set back to the teacher, who marked down how long the student had taken on the task, and what the student's

general academic standing in the class was: Very good, Good, or Poor.

While no time limit was established during the pilot study completion of the test, it did serve to determine the time range for all fifteen items on each of the two sets. The range of time was 35 to 70 minutes. There was no relationship between ability (according to the teachers' evaluation) and the time duration for students to accomplish the sets. Some very good students as well as some good and poor students needed 70 minutes in order to complete the set, and some very good and poor students completed it within 35 minutes.

All relevant data were recorded on a chart. An example is given in Table 3.1 below.

The table includes the time it took for every subject to complete the set of situations, the gender of the subject, the teacher's evaluation of the student (very good, good, poor), and the number of ideas that were generated in each of the situations.

Table 3.1. Schamatic Summary of Information Concerning the Pilot Study

Subject	Time	Gender	Teacher's evaluation on student's standing	No. of ideas on each situation 1 2 3...15 Total

The information gained in this pilot study furnished several decisions:

a) The pilot study indicated which situations adapted from TOPS and from PEPSI were discriminative. It was found that eight situations out of fifteen adapted from TOPS and nine situations from PEPSI were challenging enough for gifted students in 6th grade but at the same time not impossible for non-gifted students in 4th grade.

b) A time limit of 45 minutes was optimum for all grade levels to accomplish most of the situations in each set. The teachers and "strangers" who administered the RLPSSS were instructed to allow 45 minutes for its completion. This was a realistic estimation of the time required for most of the students to respond adequately to the set.

In order to avoid a ceiling effect with the gifted students, two more situations were added to the final RLPSSS, so that the final study set consisted of 17 situations. However, owing to a technical failure in Situation No. 15 in some of the RLPSSS sets, it was decided to delete this situation from the final analysis.

c) Some details in two illustrations have been modified as well as several questions regarding the situations, in order to avoid ambiguity and to comply with local realities and norms.

d) The pilot study provided organizational/ logistical information that formed the basis for amending procedures in the main study.

In addition, a meeting was held with the teachers who participated in the Pilot Study. One of the practical improvements emerging from this meeting was the addition of written instructions to administer the set of situations in the main study (i.e. home-room teachers and strangers). These additional written instructions were designed to ensure as much uniformity as possible in the administration of the sets to all the participating subjects.

II. Main Study

The main study included administration of the TAI, the SAI and the now-adapted RLPSSS.

The study was conducted with fourth, fifth, and sixth grades, a total of six classes, three of which were for gifted students and three for non-gifted students.

The main study was carried out in two stages:

1. The administration of the TAI (On December 13, 1989).

2. The administration of the SAI and RLPSS (On December 20, 1989).

Stage 1

The first stage of the main study was aimed to collect data regarding the Trait Anxiety of all the participating students. These data were then used to match the subjects into two equal groups.

This first stage included: preparation before the administration of the Trait Anxiety Inventory (TAI), the administration of the TAI, the matching of the students and their random assignment into treatment and non-treatment groups. Description of the procedures is given below.

Preparations for TAI administration

A meeting with the six home room teachers and the school Principal was held to provide instructions for administering the TAI. The teachers were acquainted with the research and were asked for their cooperation, and informed criticism. Arrangements for the research were then confirmed. The researcher met with the teachers on an individual and group basis, then sent out written instructions in order to ensure that all teachers followed a uniformly procedure.

Administration of TAI

The TAI was administered to the students in their classes by their home-room teachers. The following written instructions to each teacher were intended to ensure standardization.

To (Name of teacher):

Attached are enough questionnaires for all the students in your class. It is important that these questionnaires be filled out in the same way at the same time by all the students participating in the study.

a) Please read the following instructions to the students before the distribution of the questionnaires:

"Researchers from the University are investigating how children of different ages feel. Therefore, they have asked us to administer the following questionnaire. It is very important that you try your hardest to be clear in your answers. There is no correct or incorrect answer for any given item".

b) After reading the above statement, distribute the questionnaire and read the directions out loud while the students follow along silently.

c) Ask the students to underline only one of the three possible choices as an answer: Almost Never, Sometimes, or Often. (See Appendix A for copy of TAI).

d) If a student has any question about a specific item, the teacher is to answer vaguely with the following statement: "Answer how you feel generally". If the student has a question about a specific word, repeat the word as a clarification, but do not explain or define it.

e) There will be no enforced time limit. However, experience suggests that, most students will finish in eight to twelve minutes.

f) When each student hands in the questionnaire, please check to see that all items have been completed.

g) When all students have finished, please bring the completed questionnaires to the specified room where the school psychologist, researcher, and assistant from the University will immediately score the questionnaires.

Thank you very much for your co-operation,

Tamar Zoller

Researcher

It should be mentioned that the TAI (as well as the SAI and RLPSS) were marked with the child's number as it appears on her/his class list. The numbers were entered on the back of the page of each set. The researcher used this information for the matching of the pairs in each class. The issue of gender was thus also addressed with respect to both the anxiety issue and the corresponding RLPSSS performance.

It should be mentioned, that except for the use of the numbers (as representing the subjects' names) for matching and related research purposes, all the data gathered and the information gained were treated as strictly confidential in order to preserve the anonymity and privacy of the individual.

Matching subjects on anxiety

Matching of the subjects was necessary in order to establish two equal groups regarding anxiety. Gender and achievement in school were also taken into consideration in order to control extraneous variables. These two groups were then randomly assigned to treatment or non-treatment groups.

The matching was carried out by the researcher with the help of each home-room teacher as described below. Since the study was carried out close to the end of the first school marking period, the teachers were able to evaluate the students on the basis of up-to-date grades. Each teacher had in front of her the list of children and their semester grades. The researcher had in front of her the list of the subjects' scores on the TAI. On the basis of this information, pairs of boys as well as pairs of girls were matched within each of the six classes. This matching resulted in the creation of two equal sub-groups within the gifted classes and two within the non-gifted classes.

Each of the sub-groups within the gifted and the non-gifted classes was randomly assigned to treatment or non-treatment.

To verify the matching, paired t-tests were performed between the treatment groups and the non-treatment group of the gifted as well as the non-gifted.

Stage 2

The second stage of the main study was the collection of data relevant to the research questions. At this stage anxiety was induced in the treatment groups. The level of State Anxiety was measured in all the participating subjects, who were also asked to suggest solutions to real life problematic situations presented in the RLPSSS set.

This stage of the study included the preparation for the administration of the SAI and the RLPSSS, and the administration of these tests to the treatment and the non-treatment groups.

Preparation for SAI and RLPSS Administration

In preparation for the administration of the SAI and the RLPSS, meetings were held with the six home-room teachers as a group, and then individually. In addition, the teachers were given written instructions. Separate individual and group meetings were held with six "strangers" who were to help with the administration of the study. These strangers – helpers were female students finishing

their B.A. in psychology and education. They also received
written instructions to be carried out on the testing day
(see SAI and RLPSS administration). The practicalities of
administration were discussed, and informed criticism was
encouraged. The teachers and the "strangers" also received
a phone call as a reminder the evening before the day of the
experiment.

Administration of SAI and RLPSS

On the testing day, (December 20, 1989) the home-room
teacher told the students that the class would be divided
into two as follows:

a) Those whose names were called, (the treatment
group), were to report to a specified room.

b) The remainder of the class (the non-treatment group)
remained in their home-room. After the classes were
divided, each group was given instructions according to the
research plan.

The teachers and "strangers" were instructed on how to
deal with their groups.

Non-treatment groups

The half of the class designated as the non-treatment group remained in the home-room with their regular teacher. The teachers were given the following instructions (translated from the Hebrew):

To (Name of teacher),

The following instructions have been written for you in order to ensure the standardization of the testing procedures:

a) Read the following statement to the students before you distribute the questionnaires:
"You have all been chosen to help in developing a very important test aimed at Israeli school students. You will help the researchers understand how children solve problems. First, you will answer a questionnaire similar to the one you answered before, then I will hand out booklets with interesting problems. There is no right or wrong answer. What is important is the honesty of your answer."

b) Distribute the SAI to each student and read the directions out loud as the students follow along silently.

c) Ask the students to underline only one of the possible choices as an answer: Almost Never, Sometimes, Often.

d) If a student has a questions about any specific item, the teacher is to answer vaguely: "Answer how you feel right now ". If the student has a question about a specific word, repeat the word as clarification, but do not explain or define it.

e) No time limit will be enforced. However, past experience has shown that most students will finish the SAI in between eight to twelve minutes.

f) When each student hands in his questionnaire, please check to see that all items have been answered.

g) Distribute the RLPSSS, and read the following instructions:

"You will be presented with several pictures describing various situations. Examine each picture and answer the corresponding questions. For most questions there will be more than one answer, so write as many possibilities as you can. However, if for some reasons you do not find immediate

possible answers for a certain question go on to the next
situation."

h) As with the SAI, if a child has a question about a
specific situation, answer vaguely, according to the
suggestions given above.

i) No time limit will be enforced for the RLPSSS.
However, after 40 minutes announce that there are 5 more
minutes for finishing writing.

j) Collect the sets and bring them to the headquarters
room of the study.

<div align="center">

Thank you again,

Tamar Zoller
Researcher

</div>

Treatment Groups

The students assigned for the treatment groups were

instructed to proceed to a different classroom. Waiting for

them was a stranger, (someone they had not seen previously).

The stranger announced that an important test would be

administered. That test was supposed to have important

consequences for the children's future, and their

responsibility for these consequences was made clear to

them. The strict way the instructions were presented to the

treatment groups and the sudden presentation of an

unexpected test, without letting the students the

opportunity to prepare for it were supposed to contribute to

the tension experienced by the students.

Each one of these elements is sufficient by itself to

arouse anxiety. Taken together the impact was assumed to be

more powerful (see: Induction of Anxiety).

The following instructions were given to the strangers for the administration of the SAI and RLPSS to the treatment groups:

To (name of administrator):

The following instructions have been given to you in order to help standardize the testing procedures.

a) See that all students are seated; sit one to a desk. Introduce yourself by only your name and profession.

b) Read the following introduction in a serious tone to your voice:

"Today you will be taking a series of tests that are crucial for **your future**. These tests will begin with easy tasks and become harder and harder. Any questions you might have, will be answered only when each student has finished. Before we start to test you I will distribute a questionnaire similar to the one you have already taken. Honesty in answering is extremely important. There are no right or wrong answers, only honest or dishonest answers. Please answer as precisely as you are capable of."

c) Distribute the SAI and read the instructions out loud while the students follow along silently.

d) No time limit will be enforced. However, experience shows that most students will finish in between eight to twelve minutes.

e) When each student hands in his questionnaire, please check to see that all items have been answered.

f) Distribute the RLPSS and read the instructions out loud:

"We will start the series of tests by presenting several pictures. Examine each picture and answer the corresponding questions. For most questions there will be more than one answer. So please write down as many possibilities as you can. However, if for some reasons you do not find immediate solutions, go on to the next situation."

g) No time limit will be set for the RLPSS. However, after 40 minutes announce that there are only five minutes for finishing writing.

h) No questions are to be answered while the students are still taking the RLPSS.

i) When all of the tests have been collected debrief the students with the following statement:

"The 'tests' you have just completed are part of a study to understand how Israeli children feel and how they solve real life problems. Your responses will have no bearing at all on your future, nor will they count as a grade in any of your classes. The researchers thank you for your cooperation, and if you have any questions feel free to discuss them with your home-room teacher."

j) Please return all the SAI and RLPSS to the headquarters of the study.

Thank you again,

Tamar Zoller

Researcher

Data Processing

Data collecting and scoring consisted of two parts relating to:

1) Anxiety scores as measured by TAI and SAI.

2) Real-Life-Problem Solving performance scores as measured by the RLPSSS.

Scoring for Anxiety

The anxiety scores, (TAI and SAI), were recorded on each form and entered at the top of the front page. On the back of the form, the student's number was already recorded before. In this way, it was possible to use the TAI scores, dealt with earlier, for matching the pairs, and to use this information later for all needed comparisons. The SAI was similarly recorded and the total scores were coded. All the

completed forms of TAI and SAI were double checked by a University student who assisted in the study.

Scoring of the RLPSSS

The RLPSSS booklets were collected and assembled into twelve packages representing the treatment and non-treatment groups of the six classes. Each RLPSSS booklet was marked by a colored sign representing the kind of the group (i.e. grade, gifted or non-gifted treatment or non-treatment). In addition,@@each booklet was identified by the student's code number. The data processing for the RLPSSS comprised the following stages:

a) Five judges (two psychologists, one counselor, one special education teacher and one elementary school teacher) were given one packages or more of the booklets (each package contained the RLPSSS sets of one group). The first task of the judges was to record all the answers.

None of the judges knew with what grade or group she was dealing. This step helped maintain the objectivity of the judges, and avoided consistently biased judgements.

b) A meeting with all the judges followed the recording of subjects' responses. This meeting was held in order to discuss the policy and uniform methodology to be used in the scoring of the RLPSSS.

c) At this meeting it was decided how to score the RLPSSS. Ideally, one would like to have a qualitative index for scoring the RLPSSS. Unfortunately, the assessment of such instrument is known to be problematic. The well-known

established instruments have their limitations due to the
need to compromise between qualitative and quantitative
emphases (Treffinger, 1974; Renzulli, 1983; Feldhousen,
1985). In addition, since the RLPSSS is not an established
instrument but one adapted for this specific study, the
issue of scoring was handled with great caution.

The simultaneous administration of the RLPSSS to all
the subjects that were involved in this study justifies any
comparisons regarding the subjects. They all (gifted vs non-
gifted, treatment vs non-treatment) worked at the same time.
However, it should be emphasized that any comparison with
different samples at a different time may be misleading. For
such comparison a well-established real life problem-solving
test is required (see Limitations constraint). However, for
the purpose of this study the instructions of the judges on
scoring seem to be appropriate.

The initial marking of the RLPSSS consisted of two sets
of scores: i) the RLPSSS performance score which included
all the relevant different alternatives, and ii) Fluency
score, which included the subjects' total number of
responses.

i) **RLPSSS Performance score:** Every relevant different
idea that the subject provided for each situation was scored
with one point. The sum of total points over all the
situations was considered as the performance score on the
RLPSSS. $(X_1 + X_2 + \ldots + X_{16} = X_{Total})$. The larger the number of

the points the higher the score on an interval scale of performance.

ii) **Fluency score:** Following the recording of the subjects' responses, one became aware that some ideas were expressed by the same subject in several ways. These kinds of relevant responses were recorded separately as the Fluency score, $(F_1 + F_2 + \ldots + F_{16} = F_{Total})$.

The above process of scoring is illustrated in the following example. The first situation of the RLPSSS (see Apendix B), presents the dilemma of two children who had opened the door of their home to a stranger, in spite of their parents' warning not to do so when being alone at home. The subjects were initially asked to state the problems which this situation presents. All kinds of suggestions were offered. One way of looking at the problem was to find out who the man is. Some subjects perceived him as a dangerous person (a thief, a murderer, a rapist, a kidnapper, a terrorist, a drug dealer, etc.), and therefore, by opening the door they might get hurt. Other subjects thought that he might be a friendly person (friend of the parents, a new relative arriving from Russia, a salesman etc.), so that by not letting him in, they might offend him, and cause problems to the relationships of their parents with him. Another way of looking at the problem was suggested by subjects who perceived that the main issue was the fact that the children disobeyed the parents'

instructions, which leads to the question: "How could the parents trust them next time?"

The example above demonstrates how the marking was pursued. Subjects who mentioned the possibility that the man might be dangerous, or a family friend (with the consequences of opening the door), gained one point for each idea. Any additional idea was scored with another point. However, if a subject provided several responses regarding the idea of the man being dangerous, and mentioned several characteristics of the man (a rapist, a thief, a prisoner who escape from jail), his performance score on RLPSSS was only one point, but his Fluency score gained three points.

Although fluency does shed light on some additional qualities such as language, style, ability to express oneself etc., it shifts the emphasis towards other dimensions. Being as important as it is, fluency requires different interpretation. Therefore, in spite of the fact that the RLPSSS was scored for fluency, it was decided not to include the results, which were similar to the main RLPSSS results, in the discussion of the findings.

d) Continuing this line of thought, the judges decided that no attention would be paid to issues such as style, elaborations, spelling or handwriting,@@which, though very important in the wider context, were not variables in this study. It was agreed that the final conclusions and interpretation of this study should be based only on the analysis of the RLPSSS performance score.

At this meeting, problematic answers were submitted for discussion in the judges' forum. The judges eventually decided on a procedure for specific evaluation of these responses. (For example: irrelevant responses). Owing to the very few irrelevant responses, it was decided to disregard them by scoring them with zero).

e) After the policy for scoring was agreed upon, the judges again received packages of test booklets (randomly distributed, and not necessarily the ones they had before). The points awarded for each RLPSSS situation in every set were recorded on the relevant pages of the booklet, and summed for a total score, which was written on the front cover. The total score reflected, at least in part, the repertoire of ideas a subject could bring to bear on dealing with life-situation problems.

f) After the RLPSSS were scored, another meeting of the judges was held for the purpose of finalizing the scoring procedure.

g) A final chart was prepared by the researcher. At this point, the coded information relevant to the identification of the pairs, gender, grade, gifted or non-gifted, treatment or non-treatment, was used.

The following categories are included in the form which was submitted to statistical analysis:

Table 3.2: Summary of Information Concerning the Main Study

```
+--+----------+------+---+---+-----------------+-----+
|ID| Exp/Cont.|Gender|TAI|SAI|X1+X2.......X16  |Total|
+--+----------+------+---+---+-----------------+-----+
```

ID: Refers to the Identification number of the subject.

Exp/con: Refers to the sub-group that the subject belonged to. Exp.(treatment) was coded as (1), and Cont. (non-treatment) was coded as (2).

TAI: refers to the subject's scores on the Trait Anxiety Inventory.

SAI: refers to the subject's scores on the State Anxiety Inventory.

X: Refers to the subject's performance score on the RLPSSS. It includes all the relevant alternative ideas provided for the situation.

X_1, X_2, ...X_{16}: refer to the subject's different relevant ideas regarding every one of the situations 1, 2, 3......16.

Total: refers to the total performance score on the RLPSSS.

Statistical Hypotheses

Each of the research questions set out in Chapter 1 are given below as null hypotheses for statistical testing. The null form was chosen in preference to the directional one owing to the ambiguity existing in this field of study and the quality of the evidence that it was possible to mount in support of the testing directional hypotheses.

1) There will be no statistically significant difference in the RLPSSS mean performance scores between the gifted groups and the non-gifted groups.

2) There will be no statistically significant difference in the RLPSSS mean performance scores between the

Treatment (induced-anxiety) groups and the Non-treatment (non induced anxiety) groups.

3) There will be no statistically significant interaction between Giftedness and Treatment.

The following research hypothesis is tangential to the central problem stated in Chapter 1, and is of an exploratory nature.

4) There will be no statistically significant difference in the RLPSSS mean performance scores between gifted boys and gifted girls.

Method Of Analysis

The analysis of the data included two stages:

1. Analysis of data concerning anxiety induction (anxiety before and after the induction of anxiety).

2. Analysis of data concerning performance on the RLPSSS test.

1. Regarding Anxiety

It will be recalled that in stage 1 of this study the subjects were matched on TAI scores. Equality of the two groups (treatment vs non-treatment), of gifted, as well as non-gifted, was verified by paired t-tests.

Anxiety was induced in the randomly selected treatment groups, and the levels of anxiety (according to SAI scores) were compared between the treatment and non-treatment groups of the gifted and the parallel groups of the non-gifted. The

procedure for this purpose was again the application of the paired t-tests.

Level of Statistical significance

The level of statistical significance in respect of the paired t-tests in respect of the induction of anxiety was .01.

This level was decided on in order to insure that there was indeed an effect of anxiety on the treatment groups. Without this effect there would have been no point in proceeding with this investigation.

2. Regarding RLPSSS

A comparison of the RLPSSS performance of Treatment and Non-Treatment groups of Gifted and Non-Gifted children was carried out by a two way ANOVA. The ANOVA takes into account more than one factor simultaneously and relates to Research Hypotheses 1, 2 and 3.

Owing to the small number of gifted girls, a three way ANOVA design that would include gender was not possible, because of the uneven and disproportionate cell sizes.

The exploratory Research Hypothesis 4 was tested only in a qualitatively way.

Level of Statistical Significance

The choice of an alpha-level for testing the statistical hypotheses was based on consideration of the consequences of making a Type I or Type II error in deriving inferences from the results of the analysis of the data. Since this study deals with anxiety, the risk of making a Type I error or Type II error is a crucial consideration. Either error is serious. A very small &alpha.-level would indicate a very small risk of a Type I error, incorrectly inferring that there was a treatment effect, while a large &alpha.-level would indicate a large risk of such an error. A Type I error could have educational consequences, if anxiety is taken into account unnecessarily in training students how to deal with real-life problem situations. However, A Type II error, incorrectly inferring that there is not an anxiety effect when there really is such an effect, could be serious because an important factor would not be taken into account in training students.

The decision, therefore, was to accept a higher risk of a Type I error and to use an alpha-level of .10 in order to minimize Type II error.

Additional qualitative data in the form of profiles of mean item scores on the RLPSSS comparing boys vs girls, gifted vs non-gifted, and treatment vs non-treatment conditions, are given in the next chapter as a matter of possible interest for further research.

Summary

This chapter has provided a detailed description of the population (target population and accessible population). The procedure for selecting the gifted and non-gifted groups, and the manner of matching them into two equal units each was discussed. The two gifted units were randomly assigned to be either a treatment group (anxiety-induced) or a non-treatment (control group). The same procedure applied to the matched units of the non-gifted students. The variables discussed were: Treatment, Non-Treatment, Giftedness, Non-Giftedness, Gender, and Real-Life- Problem-Solving-performance. The first three are independent variables and the fourth is a dependent variable.

The instruments for assessing anxiety were Spielberger's Hebrew version of TAI for measuring Trait Anxiety and SAI for measuring State Anxiety. TAI scores were used for dividing the groups into two matched one. SAI scores were used in order to examine if anxiety was successfully induced.

Induction of anxiety was based on combination of elements that are considered to increase anxiety in school children such as: introducing suddenly a test, the purpose of which is unclear, but which implies meaningful consequences for the children's future. This test was presented by a "stranger" in an unfamiliar room. Owing to ethical considerations, the induction of anxiety included only elements that are related to school.

The depended variable was measured by a Real Life Problem Solving Situations Set (RLPSSS). This set was adapted through a pilot study employing two real life problem solving tests: PEPSI (1976) and TOPS (1984). The performance of real life problem solving was assessed by a score based on the total relevant alternative ideas every subject generated in response to the situations presented in the RLPSSS.

The main study was conducted in two stages. Part I was devoted to matching the groups, and Part II was concerned with assessing real life problem solving performance of the groups (gifted and non-gifted under different anxiety conditions: treatment vs non-treatment).

Conclusions regarding the data collecting and data processing were determined by five judges and the researcher. Results obtained from the different analyses are presented in the next chapter.

CHAPTER IV

ANALYSIS OF DATA AND RESULTS

Introduction

The results of the present study are presented in this Chapter. Included are the research problems investigated and results based on analysis of the data.

The first part of this chapter addresses the questions having to do with the intervention (anxiety induction), while the remaining part relates to problem solving in real-life situations under the various conditions noted in the previous chapter, namely, anxiety, giftedness, and gender.

Recapitulation of the problem: The general problem investigated in this study was the effect of induced anxiety on the performance of gifted Israeli children who were called upon to solve life problems.

Results

I. Anxiety Study

Before Treatment

A matched pair t-test was performed comparing the Trait Anxiety Inventory (TAI) scores, of the matched treatment and non-treatment gifted groups. The purpose of this comparison was to verify that the matching of these two groups was successful, so that they did not differ significantly in their level of anxiety before the induction of anxiety to the treatment group. Table 4.1 presents this comparison.

Table 4.1: Comparison between Treatment and Non-Treatment Gifted Groups on Trait Anxiety Inventory (TAI) Mean Scores

```
-----------------------------------------------------------

  TAI              M         SD        N         t

-----------------------------------------------------------

   Treatment      33.6      6.96      35
                                                    0.21

  Non-treatment   33.51     6.12      35

-----------------------------------------------------------

   p = 0.84
```

Table 4.1 gives the results of the two groups of gifted students. The groups did not differ significantly in terms of TAI mean scores. The mean TAI score of the treatment group (N=35 gifted students) was 33.60, and that of the non-treatment group (N=35 gifted students) was 33.51.

The results also show that the variability of the TAI mean scores for both groups were very similar: regarding the treatment group: S.D. = 6.96, and the non-treatment group: S.D. = 6.12.

These data support the basic assumption that the two groups were comparable on trait anxiety before the induction of anxiety to the treatment group.

The procedures described above with the gifted groups were carried out in the same way with the non-gifted treatment and non-treatment groups. A comparison between the TAI mean scores of the matched groups was performed through the paired matched t-test. Table 4.2 presents the results.

Table 4.2: Comparison between Treatment and Non-Treatment Non-Gifted Groups on Trait Anxiety Inventory (TAI) Mean Scores

TAI	M	SD	N	t
Treatment	33.94	5.84	36	
Non-treatment	33.94	4.52	36	0.00 (approx.)

p=1.00

Table 4.2 shows that the matched pair t-test revealed no statistically significant difference on the TAI mean scores between the treatment and the non-treatment matched groups of non-gifted students. The mean TAI score of the treatment group (N=36 non-gifted students) was 33.94 and that of the non-treatment group (N=36 non-gifted students) was also 33.94. Regarding the variability: treatment group SD=5.84, and the non-treatment group SD=4.52.

The results in Tables 4.1 and 4.2 indicate that essentially, the matched students, gifted as well as non-gifted, in both, treatment and non-treatment, assigned groups, initially had the same level of trait anxiety before treatment.

After Treatment

Following the induction of anxiety in the treatment groups, all the subjects were asked to respond to the State Anxiety Inventory (SAI). The SAI instrument measured the level of anxiety the children experienced at the time of the session in which the Real Life Problem Solving Situation Set (RLPSSS) was presented. All the groups, gifted and non-gifted, in treatment as well as in non-treatment assigned groups, responded to the SAI at the same time, but under **different circumstances.** The treatment groups responded immediately after anxiety was induced, and the non-treatment groups responded in their natural home-room setting.

The matched pair t-tests comparing the SAI scores of the two sub-groups, treatment and non-treatment (gifted as well as non-gifted), were conducted in order to examine whether anxiety had created a statistically significant difference at the level of alpha = 0.01 between their anxiety mean scores on the SAI. This alpha-level was set since any conclusion regarding performance under two situations "treatment" "non-treatment" would be relevant only if anxiety is evident with a very small risk of type I error.

It was assumed that if the anxiety induction was successful, the treatment group of the gifted students and the treatment group of the non-gifted students would score higher on the average than would their matched-pair counterparts in the non-treatment groups. Table 4.3 presents

a comparison between the performances of the matched-treatment and non-treatment gifted groups on the SAI.

Table 4.3: Post-Treatment Comparison of the State Anxiety Inventory (SAI) Mean Scores between the Treatment and the Non-Treatment Gifted Groups

SAI	M	SD	N	t
Treatment	35.37	7.56	35	3.67
Non-treatment	30.66	4.22	35	

p = 0.0008

Table 4.3 shows the results of the test on the differences between the means on the SAI of the treatment and non-treatment groups for the gifted students. The effectiveness of the anxiety induction treatment is indicated by the matched pair t-test results; There is a statistically significant differences between the two groups of gifted students at p<0.001. The mean SAI score of the treatment group was significantly higher than that of the non-treatment group, (35.37 vs 30.66). These results suggest that the planned manipulation of anxiety produced the anticipated response.

It should be noticed that while the standard deviation (S.D.) of the non-treatment group was 4.22, the S.D. of the anxiety induced gifted group was 7.56. The greater S.D. in the induced anxiety treatment group reflects the fact that

there was considerable diversity among individual subjects in their response to the method of anxiety induction used. This is in keeping with the definition of anxiety as a subjective state which reflects the way the individual perceives a stressful situation. Table 4.4 presents a comparison between the SAI mean scores of the matched-treatment and non-treatment **non-gifted groups.**

Table 4.4: Post-Treatment Comparison of the State Anxiety Inventory (SAI) Mean Scores between the Treatment and Non Treatment Non-Gifted Groups

SAI	M	SD	N	t
Treatment	35.78	8.35	36	
Nontreatment	29.56	4.35	36	4.03

p=0.0003

Table 4.4 shows the evidence for induced anxiety in the treatment group of non-gifted students. This group experienced anxiety under similar settings and at the same time as the gifted group.

The effectiveness of the anxiety inducing treatment is evidenced by the mean-score difference on the SAI of the non-gifted subjects in the treatment group and the non-treatment group. This difference was found to be

statistically significant. The data here also indicate that the S.D. of the treatment group was greater than that of the non-treatment group (8.35 vs 4.35). The interpretation that was suggested before, with the gifted, referring to anxiety as a subjective state in which every individual reacts differently according to the way s/he perceives the situation, may also apply here. The scores on the SAI for the treatment group were much more diverse than the scores of the non-treatment group. Again, the lack of homogeneity may be due to a lack of commonality in how the anxiety induction was perceived by individual subjects.

Summary of the Anxiety Study

In this part of the study attention was devoted to establishing a basis for subsequent parts of the study. The establishing of two equal comparable groups on initial anxiety (gifted as well as non-gifted), and the evidence that anxiety was induced in the treatment groups was a vital step before examining the subjects' problem solving performance under the treatment condition. If inducing anxiety did not result in a significant difference in the level of anxiety between the treatment and non-treatment groups, there would have been no justification to go on with the study. However, once it was found that the matched-groups on trait anxiety differed significantly on the day of the experiment in their state anxiety, the ground was clear

to examine the performance of the subjects in real life problem-solving situations and relate the results to the research questions presented in this study.

The second part of this chapter deals with the results concerning the effect of anxiety on real life problem solving performance.

II. Real-Life-Problem-Solving-Study

The results which follow deal with an analysis of the observations on the dependent variable: Performance on the Real Life Problem Solving Situation Set (RLPSSS).

Descriptive Data

Means and standard deviations of the RLPSSS performance scores of all the groups, treatment, non-treatment, gifted, non-gifted, boys and girls are presented in Table 4.5. These data are used in later sections of the results.

Table 4.5: Descriptive Data: Real Life Problem Solving Situation Set (RLPSSS) Means (M) and Standard Deviations (S.D.) by Treatment, Giftedness and Gender

	Non-Treatment			Treatment		
	M	S.D.	N	M	S.D.	N
Gifted	94.00	26.54	35	87.25	22.07	35
Non-Gifted	74.36	19.14	36	68.03	22.44	36
Boys						
Gifted	90.21	29.38	24	83.63	21.16	24
Non-Gifted	66.82	16.55	19	66.50	17.78	19
Girls						
Gifted	102.27	17.31	11	95.18	22.96	11
Non-Gifted	81.11	19.17	17	69.25	25.97	17

Statistical Hypotheses to be tested

The research hypotheses presented in Chapter III are repeated below for convenience to the reader.

1) There will be no statistically significant difference at the .10 level on the mean score performance on the RLPSSS between the gifted and non-gifted regardless of treatment.

2) There will be no statistically significant difference at the .10 level on mean-score performance on

the RLPSSS between the treatment groups and the non-treatment groups regardless of giftedness.

3) There will be no statistically significant interaction at the .10 level due to giftedness and treatment.

The following research hypothesis is tangential to the central problem stated in Chapter 1 and is of an exploratory nature.

4) There will be no statistically significant difference at the .10 level on the mean-score performance on the RLPSSS between boys and girls.

Analysis of Variance Results

The data was analyzed to investigate research hypotheses 1-3 by means of analysis of variance using a 2x2 factorial, fixed-effects, design.

It will be recalled from Chapter 3 that the level of statistical significance for testing all hypotheses regarding the performance of the RLPSSS was .10. The results are given in Table 4.6 below:

Table 4.6: Analysis of Variance of Treatment and Giftedness on Real Life Problem Solving Situation Set (RLPSSS) Mean Performance

SOURCE OF VARIATION	SUM OF SQUARES	df	MEAN SQUARE	F	Sig of F
Group	13405.17	1	13405.17	26.07	.000
Treatment	1516.17	1	1516.17	2.95	.088*
Group x Treatment	1.49	1	1.49	0.01	.957
Residual	70961.96	138	514.22		
Total	85884.79	141	609.11		

*Significant at the p<.10 level.

Table 4.6 shows that there were significant Group (giftedness) effects (F=26.07, p=0.000), and significant Treatment (induced anxiety) effects, (F=2.95, p=0.088), but there were no significant interaction effects, (F=0.01,p=0.957).

As an aid to interpreting these findings, the cell means of gifted vs non-gifted by treatment given in Table 4.5 were plotted as shown in Figure 4.1 below:
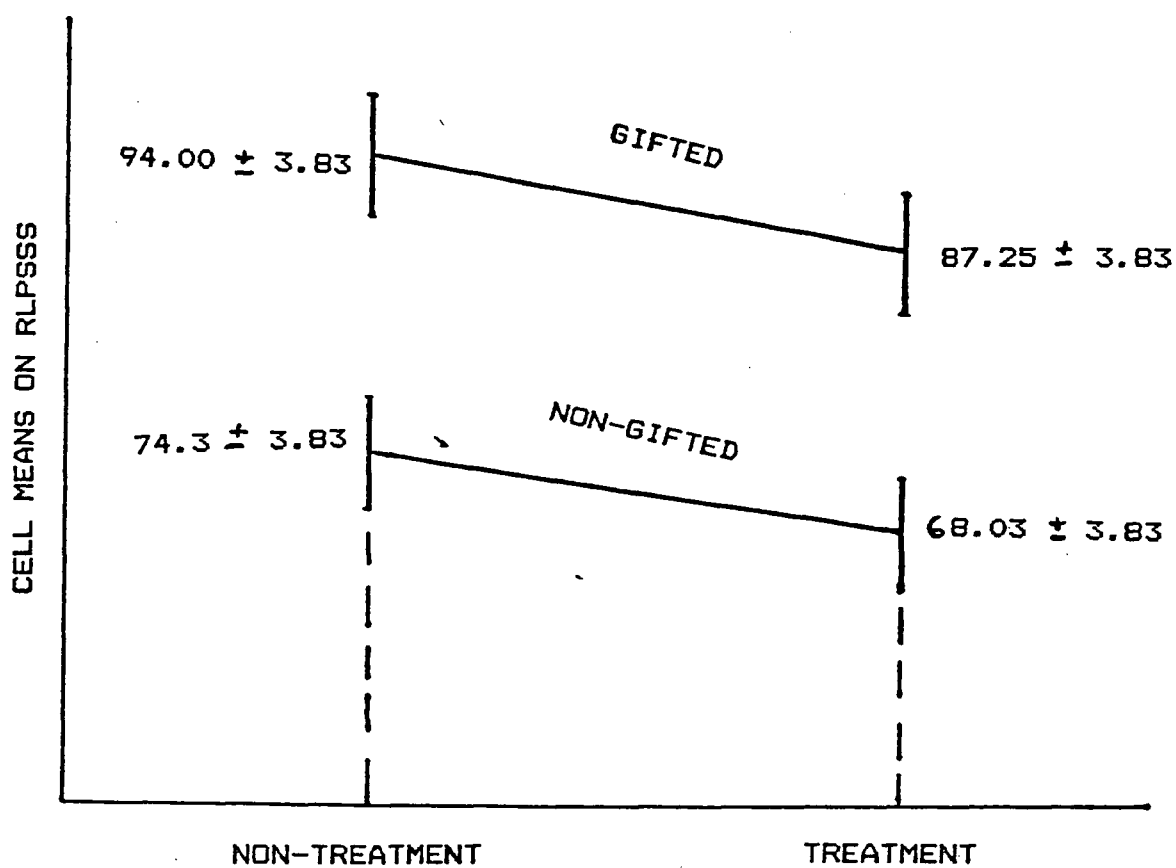
Figure 4.1: Gifted vs. Non-Gifted by Treatment

The standard error of estimate of the cell means was 3.83. Error bands of width 3.83, are depicted about each cell mean. Figure 4.1 also indicates that there was no interaction effect between treatment and giftedness.

Research Hypotheses 1-3: Interpretation

The results given above are interpreted to mean that Research Hypotheses 1 and 2 are **not tenable** at the 0.10 level of significance. What the analyses, both statistical and graphical, suggest is that the gifted group, on the average, performed at a higher level in response to the RLPSSS, than did the Non-Gifted group, regardless of treatment. However, induction of anxiety affected the performance of both groups. Both groups performed at a statistically significant lower level under induced anxiety. Since the error bands do not overlap, the cell means were taken to differ significantly.

What is particularly noteworthy about these results is that anxiety induction (considering ethical standards and a regular school setting) did affect performance on life-situation problems.

Research hypothesis 3 **is tenable.** No statistical interaction effect was found between treatment and giftedness. This is interpreted to mean that treatment and giftedness did not somehow combine to produce a joint effect of a more complex nature; only the separate main effects were statistically significant.

As an interesting aside, a comparison of profiles is presented below. Each profile presents the means of all the responses given to each situation by a certain group, (gifted, non-gifted, treatment, non-treatment, boys, girls). The line connecting the means of each group, is the profile of this group.

Figure 4.2 below presents performance profiles for the gifted and non-gifted groups who did not experience induced anxiety.

Figure 4.2 shows that in a non-treatment condition, the gifted group's profile (1) appears at a higher level than that of the non-gifted group (2) on nearly all the situations. The ANOVA indicates that the overall mean difference were statistically significant.
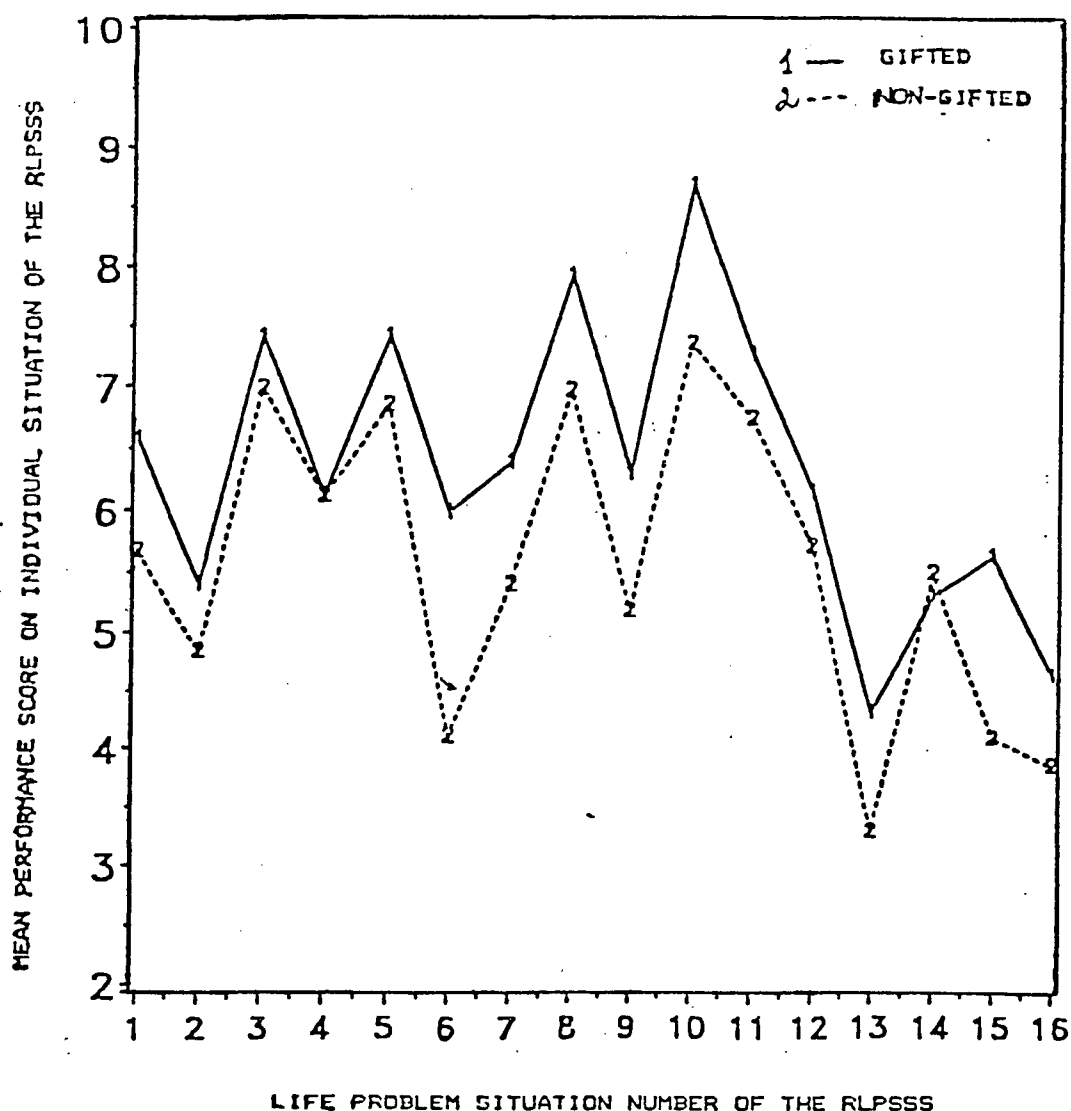
Figure 4.2: The Performance Profiles on the RLPSSS of Gifted and Non-Gifted under Non-Treatment Condition

Figure 4.3 presents the performance profiles for the gifted groups and the non-gifted groups under treatment.
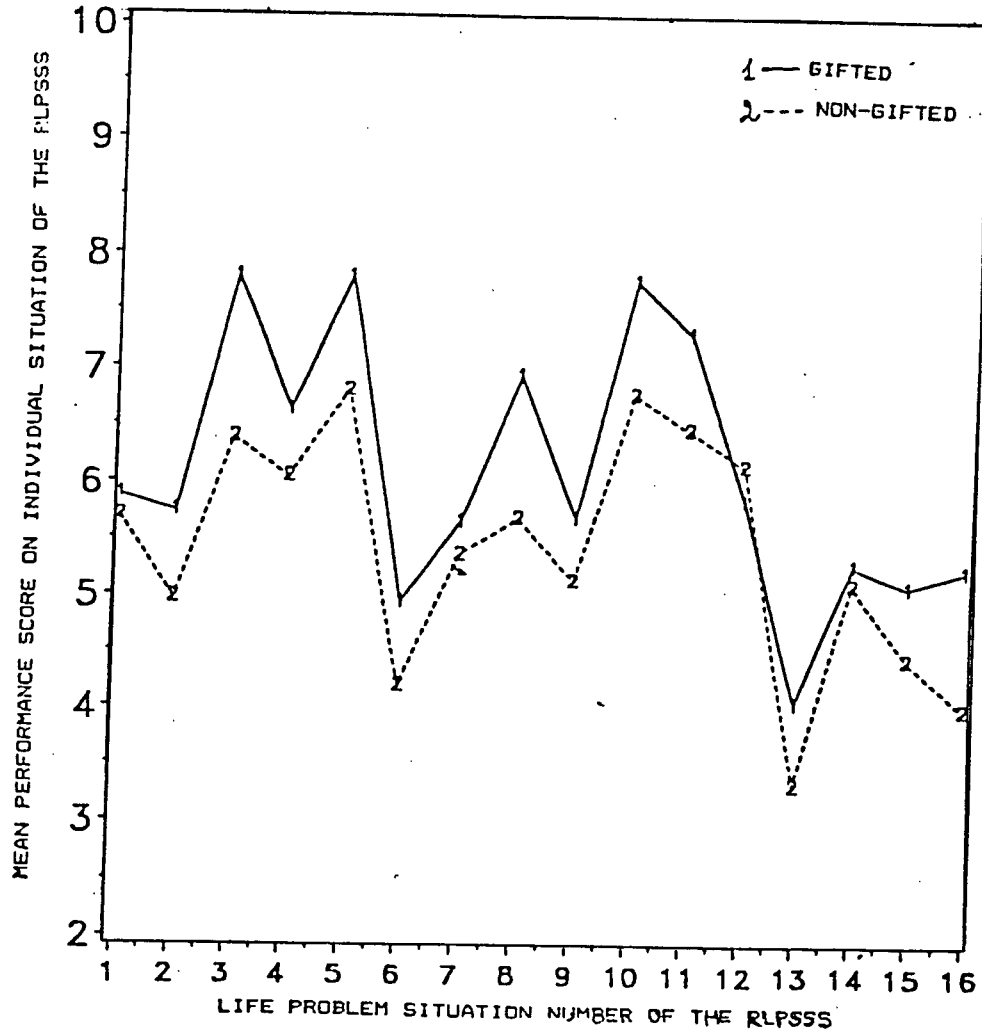
Figure 4.3: The Performance Profiles on the RLPSSS of Gifted and Non-Gifted under Treatment Conditions

Figure 4.3 suggests the same difference in the levels of the profiles of the two groups when performing under induced anxiety. The gifted profile (1) appears higher than the non-gifted (2). However, the pattern seems somewhat modified. The distinctions between the two profiles seem to depend on somewhat different situations.

Research hypothesis 4:

Research Hypothesis 4 was exploratory in nature and had to do with postulated gender effects. Presumably, if there were a relationship between giftedness and induced anxiety in coping with life-problems situations, one would wonder whether gifted boys and girls, were affected differentially in their performance by induced anxiety. While the gender postulate could not be tested statistically because of the relatively small number of gifted girls available for the study, additional non-statistical data is given with a view to more rigorous research under better sampling conditions in the future.

Table 4.5 presents descriptive data of boys and girls in the various groups, gifted and non-gifted, treatment and non-treatment. The table suggests that because of the disproportionate and small sample sizes, a 2x2 ANOVA comparing boys vs girls under the two treatment conditions would be inappropriate because of the unbalanced nature of the design. To compensate for this, qualitative data in the

form of profiles of performance on each of the 16 problem situations for both boys and girls, gifted and non-gifted, under the two treatment conditions, were obtained.

While these profiles, at best, are only suggestive, they may point to interesting questions for further study. The results, then, of investigating Research Hypothesis 4, are presented below in profile form:

Figure 4.4 suggests that under non-treatment condition the differences in level of the gifted boys' profile (1) and the gifted girls' profile (2) are not consistent. In some situations the girls provided more solutions while on others the boys provide more.

For the purpose of the study, this result is important. It indicates that the RLPSSS does not produce consistent differential gender effects when performed under non-treatment condition.
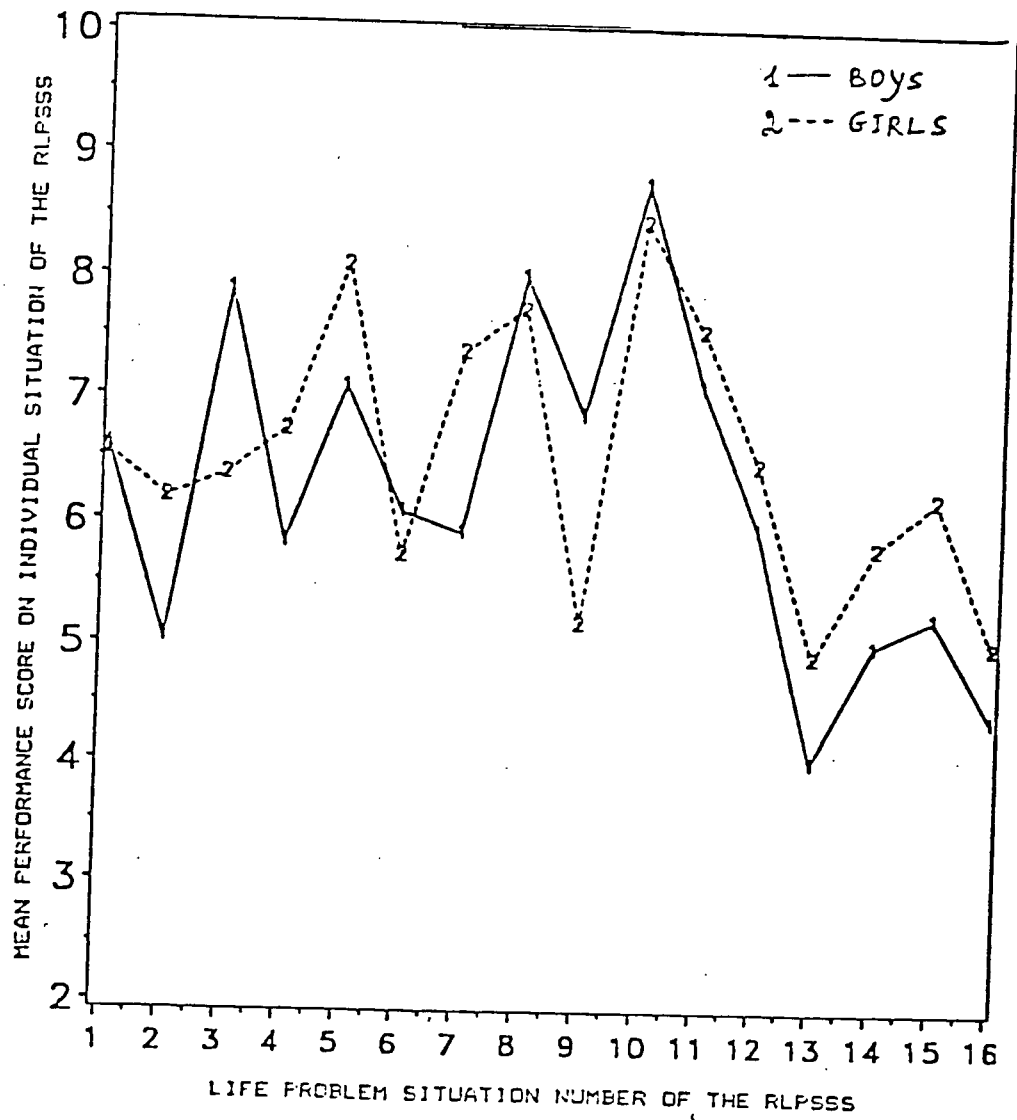
Figure 4.4: The Performance Profiles on the RLPSSS of Gifted Boys and Gifted Girls under Non-Treatment Conditions

When anxiety is induced and all other conditions remain the same, any difference in profiles may be due to a result of the effect of anxiety.

Content analysis is beyond the scope of this study. However, just for curiosity of the reader, it is of interest to note that in Situations 6, 10 and 15, (see Figure 4.2) in which the gifted out-performed the non-gifted, could be examined. It turns out that the boys and girls seemed to contribute about the same to the high performance on Situations 6 and 10, in which the gifted performance was highly distinguished. With regard to Situation 15, the girls may have performed somewhat better. Is the reason that the situation deals with furniture or is it pure chance? no answer can be provided at this stage.

Figure 4.5 shows the performance profiles of gifted boys and gifted girls under treatment (induced anxiety) conditions.

For the most part, the level of the profile for girls appears somewhat higher than the level for boys. In some situations the levels seem different, but the distinction for these situations is questionable. The possible effect of gender on performances under induced anxiety seems worthy of further investigation.
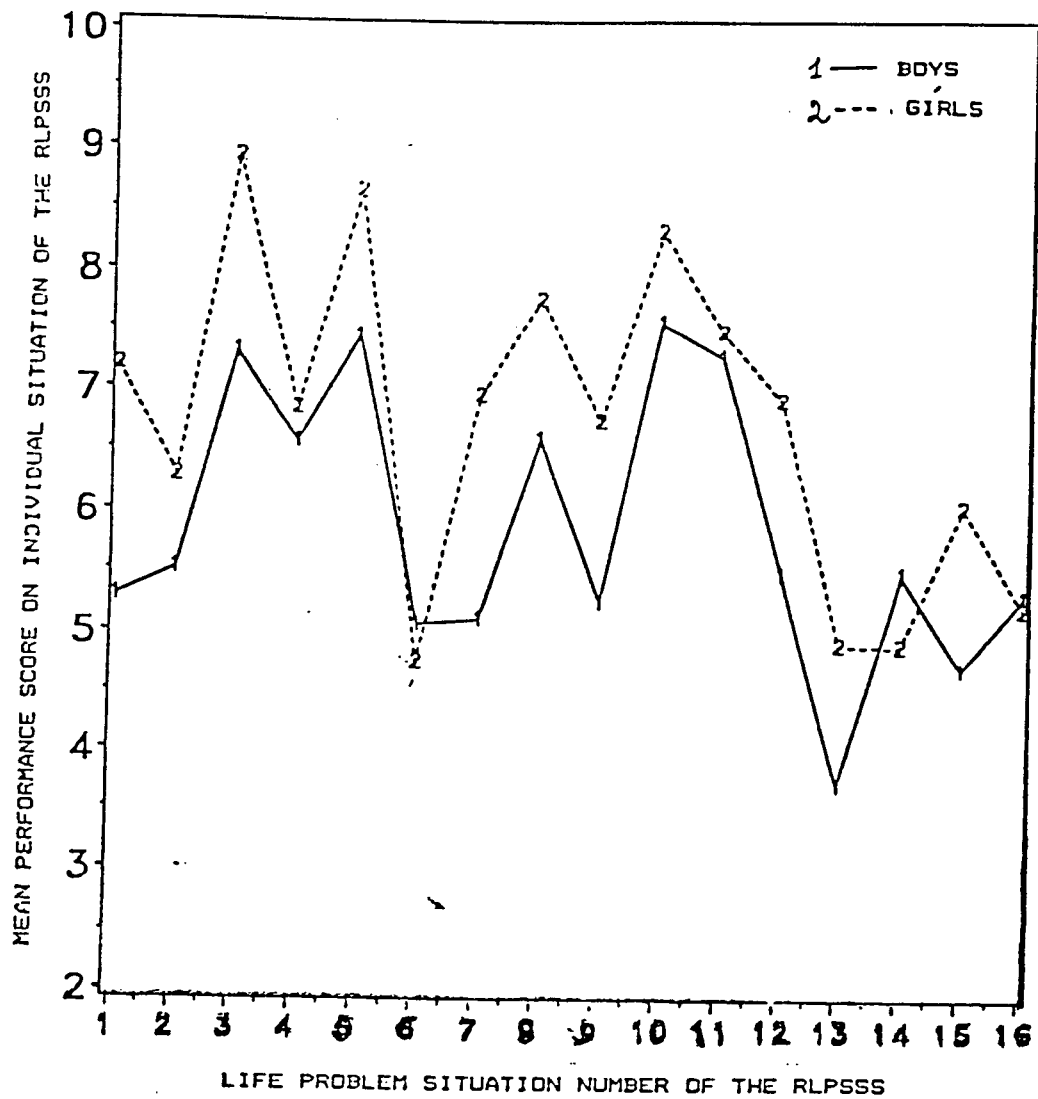
Figure 4.5: The Performance Profiles on the RLPSSS of Gifted
Boys and Gifted Girls under Treatment Conditions

Searching for even finer distinctions between gifted boys and girls, Figure 4.6 shows profiles of only gifted boys under the two treatment conditions, and Figure 4.7 shows profiles of gifted girls under the two treatment conditions.

Figure 4.6 shows that the levels of the profiles seem to fluctuate over situations, but, the differences between levels under the two treatment conditions suggest that gifted boys under induced anxiety perform more poorly on most of the situations. These profiles compared with those in Figure 4.7 (the profiles for gifted girls under the two treatment conditions), suggest a possible gender difference. Regarding the gifted girls, one may notice that at the beginning of the RLPSSS, the gifted girls under anxiety out-performed their counterparts who did not experience anxiety. Later, the levels of the profiles of the two groups of gifted girls do not seem to differ very much. One is tempted to suggest that induced anxiety does not affect the performance of gifted girls in the same direction as it affects gifted boys across most situations. Gifted girls seem to perform better under anxiety, while gifted boys seem to perform more poorly. However, this remains to be substantiated.
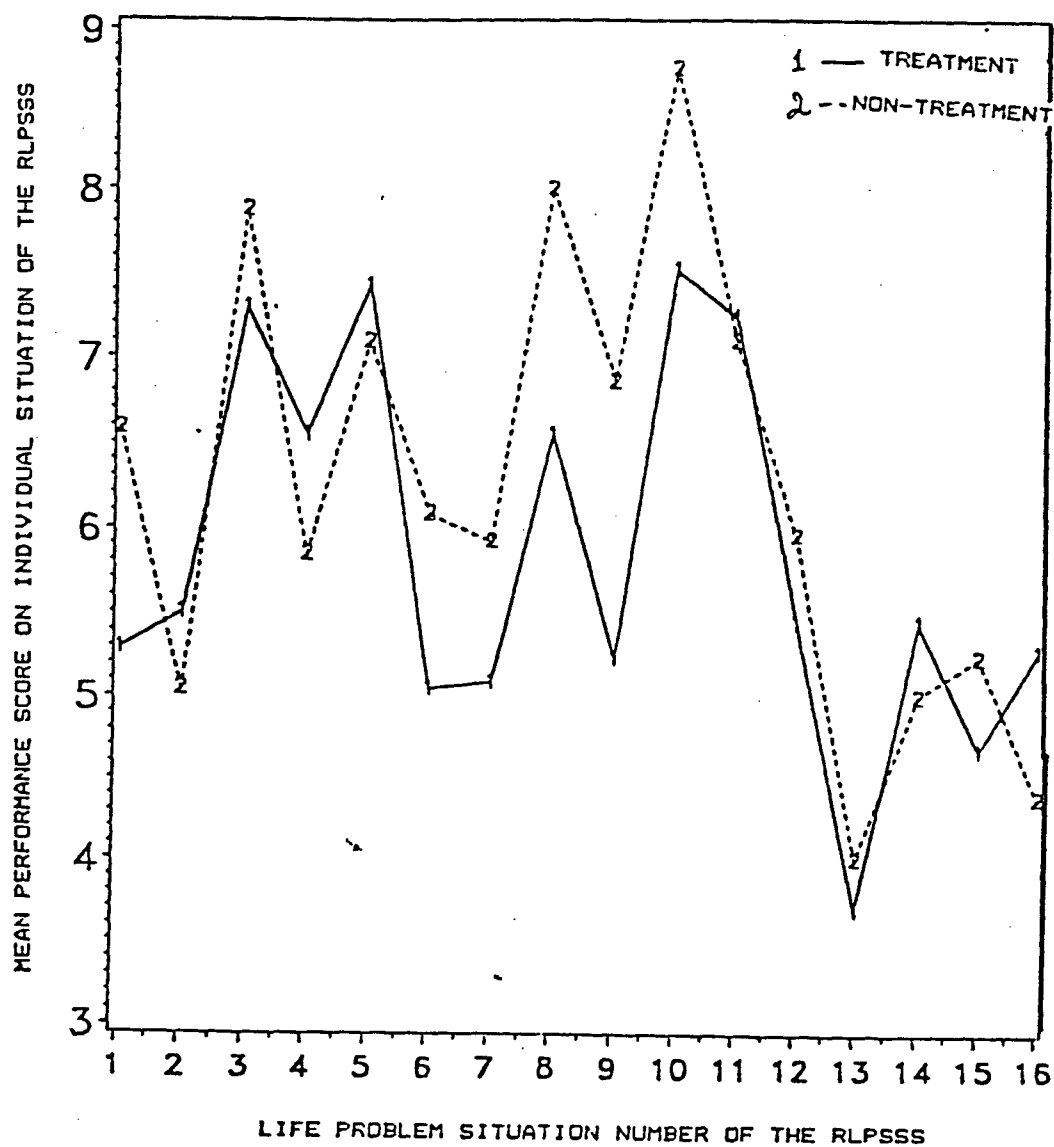
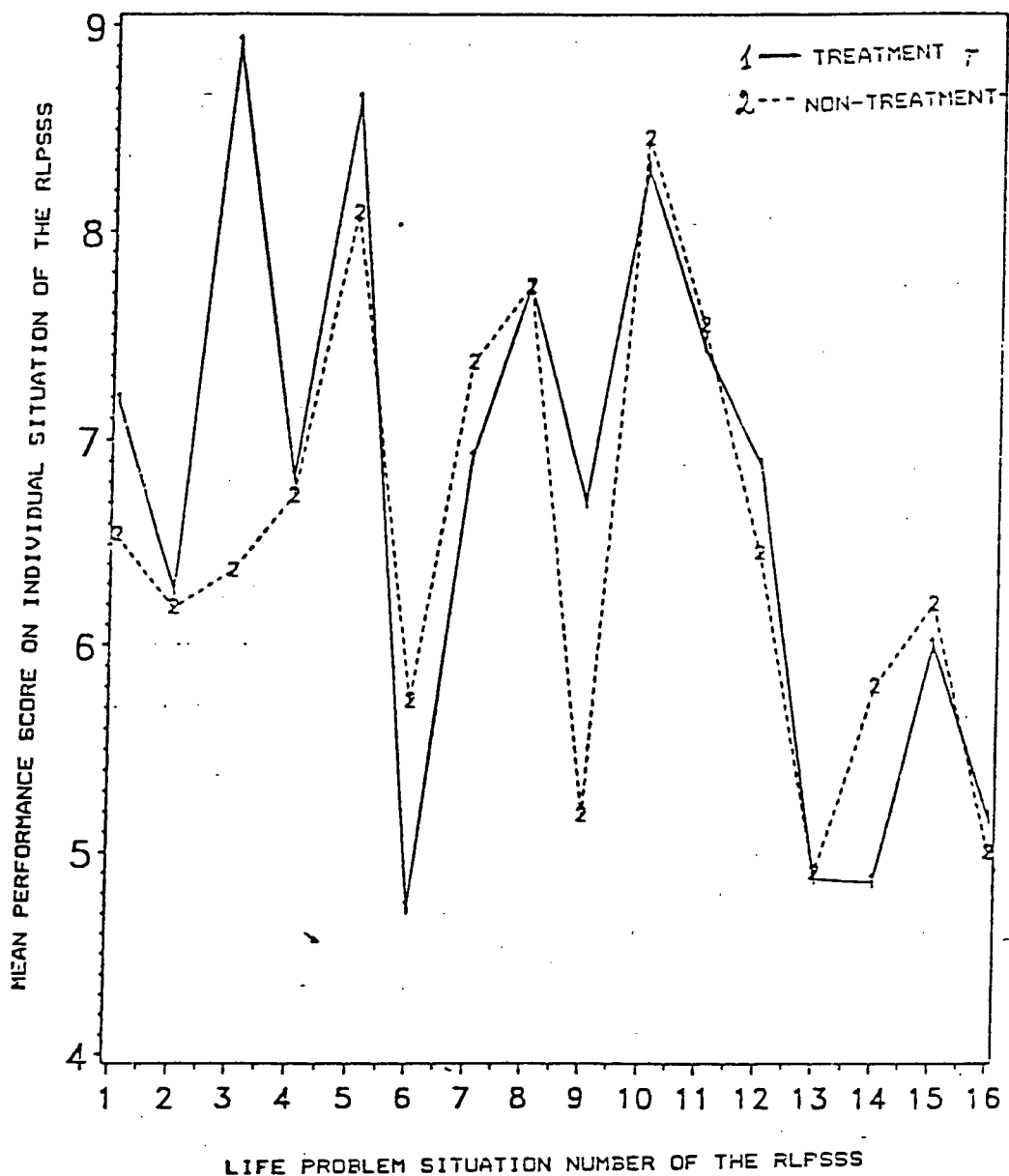**Figure 4.6: The Performance Profiles on the RLPSSS of Gifted Boys under Treatment and Non-Treatment Conditions**

Figure 4.7: The Performance Profiles on the RLPSSS of Gifted Girls under Treatment Conditions and Non-Treatment Conditions

Summary

Major findings:

The effect of induced anxiety on the performance of gifted students at the intermediate grade level in elementary school in dealing with real life problematic situations is present. Similar effect due to induced anxiety is also found among the non-gifted. However, their performance is at a lower level than that of the gifted students.

The differences between the performance of gifted and non-gifted was found to be statistically significant at the 0.001 level, regardless of treatment. No significant interaction between treatment and giftedness effects were found.

Additional finding:

Informal analyses of profiles suggested that performance, whether under treatment or not, seems to depend on the situations, and that there may be gender differences in performance under induced anxiety. Gifted boys' RLPSSS performance seemed to decrease under anxiety, while gifted girls' RLPSSS performance appeared to be unchanged, or even increased under anxiety. These findings are, at best, tentative.

In Chapter 5, the results are discussed conclusions drawn, and suggestions for further research and application made.

CHAPTER V

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

This chapter recapitulates the general purpose of the present study and the rationale for undertaking it, as well as the study's results. This will be followed by discussion, conclusions, educational implications and recommendations for further research.

Summary

Rationale and Purpose of this Study

This study is based on the assumption that modern education's task is to prepare the next generation to deal successfully with life problems. The main task of schools is not just to transfer information and knowledge from one generation to the next one, but to produce a citizen who is able to gather, handle, and process information in an intelligent way, so that he will be able to cope with life problems.

In order to solve problems, one has sometimes to take risks and has to be able to make decisions, under all kinds of conditions. One of the most prevailing conditions is the anxiety a person experiences while facing either a problem or the consequences of its solutions. Therefore, understanding the issues involved in dealing with life problems under anxiety is very relevant to the educational

process within the formal educational system. Such an in-depth understanding may effect the curriculum design and special projects to be developed and implemented in schools.

Among the special programs that the modern educational system is supposed to provide are programs for the gifted children. There is controversy regarding these special programs. One needs to decide whether they should be just "more" quantitatively, or differ as well in quality. Findings concerning the way gifted are handling real life problems and the way they perform under anxiety (with reference to non-gifted), may provide more insight into the entire issue of adequate education for the gifted.

The mutual relationship between the democratic society and its gifted population was discussed in Chapter I. It appears to be agreed that there is a need to cultivate the unique qualities of the most able in society, and there is the awareness that by providing them with programs that address their ability and needs, both they and society will benefit.

The geographical and political circumstances within which this research was conducted are also significant. Israel, is a country faced with quite extraordinary problems, not the least of which is the necessity to survive in a potentially hostile region. Consequently, the identification of the special strengths that its more gifted citizens can contribute to the common good is an urgent need. In this respect, the issues associated with the impact

of anxiety on real life problem solving of the gifted seem to be of particular importance.

The main purpose of this study was to investigate the effect of anxiety on real life problem solving performance of gifted Israeli children.

Having this purpose in mind leads to the formulation of the main problem and the research questions which follow.

The Problem

Life is in essence a continuous process of problem-solving. Dealing with life problems involves the dilemma of whether the solution found will actually solve the problem, or will generate even more complicated ones. This dilemma may cause anxiety in the individual who needs to make decisions and accept the possible risks of the way chosen for the problem to be solved.

Anxiety responses differ from one individual to another (Spielberger, 1972). The problem is, therefore, how does anxiety affect the performance of gifted children when they confront real life problematic situations that need to be solved.

The literature deals broadly with many aspects of problem-solving. There exists also a vast literature concerning anxiety and its effects. The issues related to anxiety and gifted children have been also investigated, (see: Chapter II). However, no research literature was found

concerning the combined multi-dimensional issue: Real-Life-
Problem-Solving/ Anxiety/ Gifted children.

Research Questions

The following three research questions evolved as a
result of the main problem, and are concerned with the
gifted and non-gifted students in elementary school:

1. Do intellectually gifted children out-perform their non-
gifted counterparts in solving real life problems?

2. Does anxiety affect the real life problem solving
performance of gifted and non-gifted students?

3. Does interaction between giftedness and anxiety affect
life problem solving performance?

The fourth research question focused only on the gifted
and referred to its gender differences.

4. Is there a significant difference between gifted boys
and gifted girls on their real life problem-solving
performance when anxiety is induced?

Results and Discussion

The results in relation to the first Research question indicated that gifted as a group, are better real life problem-solvers than are the non-gifted.

The interest in this comparison stemmed from the expectations of society for the gifted population. The gifted population constitutes a very small percentage of society. However, it has a high potential to contribute meaningfully to society in many ways. The mutual relationships between society and the gifted, in terms of appropriate education provided by the former, and the reciprocating contribution of the later to the former, are of particular interest. Therefore, the evidence that the gifted performed significantly better than did the non-gifted in coping with real life problems was an important finding.

One of the myths associated with the first research question was that intellectually gifted children are brilliant students having high academic achievement, but are less well-endowed for dealing with real life problems. Influential theories even viewed giftedness (or genius) as psychological maladjustment (Freud, 1936; Jung, 1954).

Another view emphasizes the helplessness feeling of the gifted in coping with life problems (Landau, 1976; Gallagher, 1978; Galbraith, 1985). This view suggests that gifted children are preoccupied with global problems, such as: nuclear war, international relationships, economy, or

with personal problems, such as: being overwhelmed by the number of things they can do in life, by the ambivalent expectations of society of them, and by their peer relationships. The gifted, according to this view, have a deep insight into the problems. However, their understanding of the complications involved just intensifies their worries, and causes a feeling of helplessness.

The results relevant to the first research question reinforce another line of thinking. This line emphasizes special qualities associated with giftedness, that may help to explain why gifted children have a higher ability to solve real life problems. Torrance (1980) discussed the readiness of the gifted to depart from traditional ways of thinking, even if they may invite stress. He suggested that the need and motivation to find a new order is so strong for the gifted that they do not shy away from coping with problems even under condition of stress.

In this context, Perron and Male's (1981) theory regarding the motivation of eminent people explains the willingness of the gifted to take risks if there is a chance to succeed. This is in contrast to the non-gifted who are motivated by fear of failure and therefore avoid taking any risks.

Davidson and Sternberg (1984) discussed the centrality of insight skills in giftedness, which may explain also the findings of this study regarding higher performance of the gifted in solving real life problems. According to Davidson

and Sternberg, the relevant psychological processes which involve selective encoding, selective comparison, and selective combination, enable the gifted to perceive the problem in many ways and reach new and alternative ideas to cope with the problem.

The results of the present study support the view that the gifted deal with real life problems better than non-gifted. A major implication of the above is that the myth of the gifted as impractical or as helpless when confronted with real life problems should be substituted by the acknowledgement that they have a rich repertoire and can handle and cope with all kinds of problems.

The gifted children should and can benefit from programs that will challenge them with practical activities to cope with relevant real-life problematic situations, in addition to the theoretical academic studies that their curriculum provides.

The results in relation to the second research question indicated that anxiety affected the treatment groups in the direction of decreased performance. Anxiety is likely to remain a feature of modern life. In this respect, anxiety is dealt with in this study, not as a pathological trait, but as a factor that is connected with the ability to deal with life problems. One of the crucial questions that educators face is whether to purposely introduce anxiety in the

educational system, or to avoid it as much as possible. This can be put in phrase such as: "To stress or not to stress"?

Many educators support intuitively the attitude that ideally one should strive to enable children to grow in a peaceful and harmonious environment and to avoid any unnecessary stress which may elicit anxiety. Such an environment is supposed to enable the development and growth of the child in peace, devoting one's energy to one's own personal development without any unnecessary distractions. (Wallach and Kogan, 1965; Getzels and Dillon, 1973; Torrance, 1980).

On the other hand, some other educators believe that if stress and anxiety constitute an inseparable part of modern life, society must find ways of enlisting anxiety as a positive force in the performance of essential duties (Dirkes, 1983).

However, no research was found to support either one of these attitudes. Research concerning the deliberate induction of anxiety is very complicated and is unpopular in the formal educational system, because of the ethical concerns which may arise. However, when such an induction is well-planned and adequately controlled, and the children are later debriefed about what was taking place, the ethical issues seem to be satisfactorily resolved. In this respect, the present study may offer an example of such an induction of anxiety.

A follow up discussion with the children who participated in the present study, revealed that the gifted, as well as the non-gifted, reacted positively to the debriefing, and liked to discuss the issues involved in the deliberate induction of anxiety, and the problematic situations. Some of them even expressed the feeling that they were happy and proud to contribute to educational knowledge by their participation in this study.

As expected, anxiety decreased the real life problem-solving performance of both gifted and non-gifted children. The importance of these results is in the demonstrated trend of decreasing performance when anxiety increased. The statistical difference between the performance under anxiety and under "normal conditions" was found to be moderate. However, in view of ethical considerations which prevented the induction of drastic anxiety in this study, it is possible that the level of the actually induced anxiety was only sufficient for obtaining a moderate overall effect in the performance and the results should be evaluated accordingly.

Given the fact that anxiety caused a decrease in performance, two major implications should be considered.

a) It may be speculated that gifted children with high levels of anxiety may score lower on their identification tests. These lower scores might determine their exclusion from the gifted program. Therefore, inclusion of anxiety scales within the battery of the identification tests, and

weighting their results with those of the other tests, may contribute to the identification of gifted who may not be identified as gifted owing to their lower performance under anxiety.

b) One task of a sound education is to "train" children to work under conditions of anxiety, so that they learn to overcome this decrease in performance. The controlled induction of anxiety under supervision in schools, may prove to be effective within the more general framework of adaptation of strategies, and development of skills, to improve performance under anxiety. This suggestion should be examined in further research.

The results in relation to the third research question indicated that there is no interaction between giftedness and anxiety. Anxiety was found to affect both gifted and non-gifted children in the same direction (See Figure 4.1, Chapter IV). Although the performance on RLPSSS of both treatment groups decreased under anxiety compared with the performance of the non-treatment matched groups, the differential in performance of the gifted as compared with that of the non-gifted children was maintained.

The hypothesis concerning the possibility of interaction between giftedness and anxiety was based on the assumption that the quality of the gifted children's performance under anxiety is probably different from that of the non-gifted children because of (a) the difference in the

intellectual level as indicated by psychological tests (conducted in Israel for their identification), (b) the differences in anxiety levels (Milgram, 1976), and (c) the difference in motivation to perform under anxiety; i.e. fear of failure vs striving to succeed (Perron and Male, 1985).

Further analysis of the research data reveals that while there is a significant difference between the two populations in their ability to solve real life problems, there is no such difference concerning the impact of anxiety on the two groups' performance.

The implication of this finding suggests that gifted are not different from non-gifted children in all aspects of personality development. Their advantage in terms of the intellectual level is well established. However, it should be kept in mind that in spite of their intellectual ability and high performance, the effect of anxiety on their performance appears to be no different from that of their non-gifted counterparts. Therefore:

a) Teachers of gifted children should bear in mind that their task is to pay attention to the general functioning of their students, and not only to their intellectual enrichment. The manner of the performance of the students under all kinds of conditions, (and anxiety is one of them), should concern the teacher of the gifted, as it concerns the teacher of the non-gifted.

b) If performance under anxiety produces similar results with non-gifted and with gifted, then any strategy of

performance under anxiety which is found to be effective with gifted children may prove to be effective with non-gifted children and vice versa.

c) Based on the findings that there is no interaction between giftedness and anxiety, and that the gifted real life problem-solving performance is affected in the same direction as that of the non-gifted, a new model for the gifted education can be suggested for consideration. Any program which enables the gifted to study according to their own intellectual ability, should also include provisions for the mutual involvement of non-gifted peers in areas of common interest. Both populations share in many ways the same life problems, and both respond in the same way under anxiety. A model which acknowledges the special intellectual needs of the gifted, while at the same time suggests "joint projects" for gifted and non-gifted, could be offered as a part of special programs. The "joint project" should include workshops which focus on strategies to cope with real life problem-solving dilemmas, and with anxiety.

Instead of the "pull-out" program, in which the gifted leave the regular "home class", the suggested model offers a "pull-together" program in which gifted and non-gifted leave their special classes to join on a common ground. In this way both populations may have mutual benefit. The emotional development of the gifted can benefit from communicating with their non-gifted peers. The same with the non-gifted,

who will also benefit from discussing practical life problems with the gifted.

Based on the arguments above, it seems that the following goals that Renzulli (1977) suggested for his Type III enrichment program for gifted children are relevant as a basis for such a model:

"To assist youngsters in becoming actualinvestigators of real problems or topics by usingappropriate methods of inquiry.

To provide students with opportunities for takingan active part in formulating problems to beinvestigated and the methods by which the problemswill be attacked.

To allow students to use information as **raw datarather** than reporting about conclusions reachedby other persons.

To provide opportunities for students' inquiryactivity to be directed toward some tangibleproduct.

To provide students with an opportunity to applythinking and feeling processes to real situationsrather than structured exercises". (Renzulli,1977, p.9).

The non-gifted may provide problems that the gifted even did not consider as problems, while the gifted may serve as a model by sharing the way they solve problems. The mutual benefit will grow through the opportunity to communicate about subjects of common interest, where each population learns to understand and respect the frame of reference of the other.

This idea should, of course, be further explored.

The fourth research question was tangential to the main study. It related to gender differences. The literature

reports differences between gifted boys and gifted girls in the style and the way each gender deals with problems (Maccoly and Jacklin, 1974; Perrone and Male, 1981; O'Tuel, 1989; Cramer, 1989; O'Tuel, 1989; Bell, 1989). The reports concerned with anxiety levels suggest that gifted girls have higher levels of anxiety than do gifted boys (Milgram, 1976; Taiwan, 1981).

The results regarding anxiety in this study are in accordance with what the literature reports. Gifted girls reported higher levels of anxiety than gifted boys. However, regarding real life problem-solving, the data indicated that gifted girls increased slightly their performance under anxiety in contrast to gifted boys whose performance decreased under the same condition.

There are two ways to interpret these results. One interpretation may suggest that gifted girls, in contrast to gifted boys, need some kind of anxiety to perform better. The other interpretation may refers to the identification tests. It is possible that gifted girls who initially are affected by their high anxiety levels are excluded from the gifted programs due to their lower performance on the identification tests. Only the girls who are able to perform better under anxiety are included. This interpretation provides a possible explanation for the small percentage of gifted girls who are identified and recommended for the gifted programs.

The suggestion to include anxiety tests and to weight their results together with the other identification tests may contribute to a selection process which could identify more intellectually gifted girls who perhaps performed at a lower level on the tests due to their high levels of anxiety.

Another implication as regards the gender difference in performance under anxiety relates to conclusions drawn regarding the general gifted population. Any such conclusion could be misleading if boys are affected in one direction, (decreasing their performance), while girls are affected in the opposite direction (increasing their performance) under the same conditions. The average of these two different direction may mean nothing.

In such a case a separate analyses for boys and for girls should be provided and conclusions should be drawn accordingly.

The issues involved in the gender differences of gifted children needs to be further explored. On account of the small number of gifted girls in this study any conclusion should be viewed with caution, until further research in this direction, with larger samples of gifted girls, confirm this result and/or clarify possible ambiguities.

Conclusions and Educational Implications

The following conclusions are based on evidence obtained from the findings of this study, and the investigator's interpretation of the results. The conclusions seem justified within the limitation of the study as specified in Chapter I.

1. Gifted children deal with real life problems better than non-gifted. They respond to life dilemmas with more suggestions regarding the identification of the problems involved, provide more ideas to solve them, and suggest more alternative ways to avoid such problems from happening.

This conclusion is in contrast to the myth that gifted children who are involved in abstract academic spheres are impractical, (sometimes even helpless), when they have to face real life problems.

The educational implication of this conclusion is directly related to the curriculum for the gifted. Attention paid to programs which challenge the gifted in coping with life problems, in their class as well as outside the class, may result in assuring the gifted that they are able to handle all kinds of life situations, and in preparing them adequately for their future responsible tasks in society.

2. Anxiety affects elementary school children's real life problem-solving in the direction of decreasing their performance. Therefore, the effect of anxiety cannot be ignored. The above conclusion challenges the current attitude of dealing with anxiety in schools as a

pathological feature. Anxiety is a given feature that has an effect on children's real life problem-solving performance.

The educational implications are that once anxiety is recognized and dealt with within the school system, ways of developing skills to cope with it, will be found. The first step, however, is to acknowledge the need of deliberately dealing with anxiety as a normative reality within the educational system. No longer can anxiety be ignored within the educational system, and any curriculum planned should take it into consideration (See: Suggestions).

3. Anxiety affects the gifted and the non-gifted children's performance in the same direction: the performance of both populations in real life problem-solving decreased under anxiety. This means that the advantage of the gifted in terms of intellectual level, which includes also their talent to out-perform the non-gifted on real life problem-solving, does not necessarily apply to other areas of their personal growth. When facing anxiety their performance is reduced in the same direction as that of their non-gifted counterparts.

The educational implications in this respect are that gifted and non-gifted may benefit from mutual interaction. They can share their experience of anxiety and work out together strategies of coping with it. The sharing of common problem sets the stage for the fruitful and mutually beneficial discussions in dealing with other life problems. The better ability of the gifted to solve life problems may

turn out to be an asset to both of these populations (see: Discussion).

4. Within the gifted population there is a gender difference in the real life performance under anxiety. Gifted girls reported higher levels of anxiety, whereas their real life problem solving performance was higher than that of gifted boys when anxiety was induced.

An important educational implication of the above relates to the identification process of the gifted. Perhaps only gifted girls who perform better than their girl peers under anxiety are included in gifted programs. This issue has to be further investigated before any definite conclusion can be drawn regarding the gender differences in real life problem-solving performance under anxiety.

Given that giftedness is a limited resource, there is a call for practices that clearly identify those with the greatest potential, boys and girls alike. This call requires a reassessment of the existing identification procedures.

Recommendation for Further Research

Some recommendations for further research following the line of this study.

1. It is recommended that the introduction of anxiety measurements as an integral part of the identification process of gifted children be investigated. Further research in order to adequately optimize the weighing process (i.e. the relative 'loads' of the anxiety test results, and the other tests in the identifying test battery) is clearly needed. Such practice may ensure that 'high anxiety' gifted children will be included in the selected gifted group following the screening process.

2. It is recommended that anxiety be recognized by the educational policy makers. The introduction of anxiety and training in terms of coping with it should be investigated in the curriculum of the gifted. In this way, anxious gifted children who entered the gifted program in spite of their anxiety, (see recommendation 1) will learn how to cope and deal with it, so that anxiety might not be an obstacle in their performance. Further research can tell us what specific teaching strategies are the most appropriate, in terms of student' achievement enhancement given the anxiety conditions under which students perform.

3. Based on the findings of this study, and in continuation of the sections dealing with the educational implications as well as the above recommendations 1 and 2, it is further recommended that a new model of gifted education be tried: This model acknowledges the intellectual needs of the gifted children within a framework of a special independent curriculum, which also includes real life problem-solving challenges. However, as an integral part of the program, based on this model, some "join projects" with the non-gifted should be included.

In view of the findings that there is no interaction between giftedness and anxiety, and that anxiety reduces the performance of both gifted and non-gifted populations it is reasonable to suggest trying a new model of gifted education. The guiding idea of this model is that instead of a "pull-out" type program where the gifted are taken out to their special programs from the regular classes, the opposite direction should apply; that is, both populations will leave their special "home-classes" and will be "pulled together" for a common enrichment experience.

The following purposes of such a model should emphasize: (a) to enable the two populations to learn together how to cope with the problem of anxiety, (i.e. awareness, strategies, skills, etc.); (b) to mutually communicate with each other concerning relevant common real life problems. In this respect, the finding that gifted were found to out-perform the non-gifted may provide them with the opportunity

to share and discuss their ideas with their non-gifted peers and thus prove to themselves and to others how practical and able they are to deal with life problems. On the other hand, the non-gifted will have the opportunity to discuss and consider ideas with capable peers rather than only with adults (teachers, parents, etc.); (c) to establish a bridge between gifted and non-gifted in which each population learns to understand the frame of reference of the other. This purpose might be achieved under well prepared supervision that succeeds in creating a generally relaxed atmosphere. In this way, the enrichment, growth, and better real life problem-solving performance of both populations might be enhanced.

A study which examines the resources (manpower, classes, budget, etc.), which such a model demands is worthwhile undertaking.

4. It is recommended that this study should be replicated with other representative samples of gifted children drawn from a wider area than it was possible to use in the present study. Such samples may enable further research regarding gender differences.

5) There were unavoidable compromises made in conducting this study due to its limitations and constrains. (See Chapter I). The RLPSSS which measured real life problem solving performance in the present study, was

achieved by employing what was essentially a local adaptation of two tests from the United States: PEPSI and TOPS. Although it is believed that the RLPSSS did not result in any significant bias in the scores of Israeli children, there is obviously a need for a Real Life Problem Solving Test developed locally. This test should include situational items to which boys and girls can relate equally. Such a validated and reliable instrument is required for further pursuing this line of research.

Concluding Remarks

This present research is believed to be a new departure in studying the effects of anxiety on the efforts of gifted children to solve the problems likely to be encountered in daily life. It is no more than an early shot in the struggle to understand young children's performance under conditions of anxiety. The Israeli child cannot escape the impact of stress and threat of his environment. Consequently, when some conditions are unavoidable, one needs to turn them into assets. With this in mind, teachers may find the means of cultivating in all children, including the brightest and most able, the inner strengths that one needs to combat the fear of living amidst daily peril and facing an uncertain future.

It is hoped that this study will help to: (a) change the approach toward the dealing with anxiety within formal education; (b) provide a method of anxiety-induction for

research purposes; (c) correct commonly held opinions about the ability of gifted children to solve real life problems and about their performance under anxiety; (d) lead to reassessment of the identification process of the gifted and, (e) initiate a new model in gifted-education in which gifted children will leave their special classes to meet with their non-gifted counterparts to share studies of common interest and common need.

BIBLIOGRAPHY

Adams, J.L. (1976). Conceptual blockbusting: A guide to better ideas. New York, London: W.W. Norton.

Antonovsky, A. (1979). Health, stress and coping. San Francisco, CA: Jossey-Bass.

Atkinson, J.W. and Feather, N.T. (1966). A theory of achievement motivation. New York, NY: J. Wiley.

Bell, L.A. (1989). Something's Wrong Here and It's Not Me: Challenging the Dilemmas that Block Girls' Success. Journal for the Education of the Gifted 12, (2), 119-130.

Blank, S.S. (1982). The challenge: Encouraging creative thinking and problem solving in the gifted. San Diego, CA: San Diego Unified School District.

Bogie, C.E. and Buckhalt, J.A. (1987). Reactions to failure and success among Gifted, Average and EMR students. Gifted Child Quarterly, 31, (2), 70-74.

Burg, B. (1984). Special Programs for the Gifted in Israel. Gifted International, 2, (2), 30-43.

Casteneda, A., Palermo, D.S. and McCandless, B.R. (1956).
Complex learning and performance as a function of
anxiety in children and task difficulty. <u>Child
Development</u>, 27, 327-332

Cattell, R.B. and Scheir, I.H. <u>The meaning and measurement
of neuroticism and anxiety.</u> Ronald Press. New York,
1961.

Chang. L.L. (1985). Who are the mathematically gifted
elementary school children? <u>Roeper Review,</u> 8, <u>(2),</u> 76-
79.

Chin-Li Tzeng. (1981). In Kuo, Wei-Fan (ed.). <u>Special
classes for the gifted and talented: a review of
research in the Republic of China. (Taiwan).</u> Paper
presented at the World Conference on Gifted and
Talented Children. (4th, Montreal PQ, Canada). ERIC
Socument Reproduction Service No. 212119.

Clark, B. (1983). <u>Growing up gifted: Developing the
potential of children at home and at school.</u> (2nd Ed.)
Columbus, Ohio, Charles E. Merrill.

Clark, H. and Hankins, N. (1985). Giftedness and conflict.
<u>Roeper Review</u> 8, 50-53.

Cox, T. (1978). <u>Stress.</u> Baltimore, MD: University Park
    Press.

Cox, D.W. (1985). The Purdue Elementary Problem Solving
    Inventory (PEPSI), grade level, and socioeconomic
    status: A preliminary study. <u>Gifted Child Quarterly,</u>
    29, (2), 72-73.

Cramer, R.H. (1989). Attitudes of gifted boys and girls
    towards math: A qualitative study. <u>Roeper Review,</u> 11,
    <u>(3),</u> 128-131.

Cramond, B. Martin, C.E. and Shaw, E.L. (1990).
    Generalizability of creative problem solving procedures
    to real-life problems. <u>Journal for the Education of the</u>
    <u>Gifted,</u> 13, <u>(2).</u> 141-155.

Davidson, J.E. and Sternberg, R.J (1984). The role of
    insight in intellectual giftedness. <u>Gifted Child</u>
    <u>Quarterly,</u> 28 <u>(2)</u> 58-64.

Davis, H.B. and Connel, J.P. (1985). The effect of aptitude
    and achievement status on the self system. <u>Gifted Child</u>
    <u>Quarterly,</u> 29, <u>(3),</u> 131-136.

DeBono, E. (1985). <u>Conflicts: A better way to solve them.</u>
    Harmondsworth, Middlesex, England: Penguin Books.

Derevensky, J. and Coleman, E.B. (1989). Gifted Children's Fears. <u>Gifted Child Quarterly,</u> 23, <u>(2),</u> 65-59.

Dewey, J. (1933). <u>How we think.</u> Boston, MA: D.C. Heath.

Dirkes, M.A. (1983). Anxiety in the gifted: Pluses and Minuses. <u>Roeper Review,</u> 6, <u>(2)</u> 68-70.

Feldhusen, J.F. and Houtz, J.C. (1977) <u>The Purdue Elementary Problem Solving Inventory.</u> In Tests in Microfiche, no.7121. Princeton, NJ: Educational Testing Service.

Feldhusen, J.F. and Treffinger, D.J. (1985). <u>Creative Thinking and Problem Solving in Gifted Education.</u> (3rd ed.) Dubuque, IA: Kendall-Hunt.

Forsyth, P. (1987). A study of self-concept, anxiety, and security of children in gifted, French immersion, and regular classes. <u>Canadian Journal of Counselling,</u> 21 (2-3) 153-56.

Freud, S. (1936). <u>The problem of anxiety.</u> New York: The Psychoanalytic Quarterly Press and W.W Narton Co.

Fuchs, D. and Fuchs, L.S. (1986). Test Ppocedure bias: A meta-analysis of eExaminer familiarity effects. <u>Review of Educational Research</u> 56 <u>(2)</u> 243-262.

Galbraith, J. (1985). The eight great gripes of gifted kids: responding to special needs. <u>Roeper Review.</u> 8, <u>(1)</u>, 15-18.

Gallagher, J.J (1975), <u>Teaching the gifted child</u> (3rd ed.). Boston: Allyn and Bacon.

Gallagher, J.J. and Kirk, S.A. (1979) <u>Educating exceptional children</u> Boston; Houghton-Mifflin.

Galton, F. (1962) <u>Heredity genius.</u> London: Colins.

Gardner, H. (1983). <u>Frames of mind: The theory of multiple intelligence.</u> New York: Basic Books.

Gaudry, E. and Spielberger, C.D. (1971). <u>Anxiety and educational achievement,</u> Sydney, New York: J. Wiley & Sons, Australasia.

George. P.G. and Gallagher. J.J. (1978). Children's thoughts about the future: A comparison of gifted and nongifted students. <u>Journal for the Education of the Gifted,</u> 2, 33-42.

Getzels, J.W., and Dillon, J.T. (1973). The nature of giftedness and the education of the gifted. In R.M.W. Travers (Ed). Second Handbook of Research on Teaching. Chicago, Ill. Rand McNally.

Gibney, T. (1982). The gifted as problem-solvers in elementary schools. Roeper Review, 4, (4), 13-14.

Gross, T.F. (1984). State Anxiety, memory and children's problem solving. ERIC Document Reproduction Service No.248986.

Guilford, J.P. and Hoepfner, R. (1971). The analysis of intelligence. New York, NY: McGraw-Hill.

Guilford, J.P. (1977). Way beyond the IQ. Buffalo, NY: Creative Education Foundation, Inc.

Guilford, J.P. (1979) Intellect and the gifted. In J.C. Gowan, J. Khatena, and E.P. Torrance (Eds.). Educating the ablest. (2nd ed.) (pp.24-40). Itasca, IL: F.E.Peacock.

Hai Chig Lin (1981). In Kuo Wei-Fan (Ed.). Special classes for the gifted and talented: a review of research in the Republic of China. (Taiwan). Paper presented at the

World Conference on Gifted and Talented Children. (4th, Montreal PQ, Canada). ERIC Document Reproduction Service No. 212119.

Harris, D.G. and Blank, S.S. (1983). A comparative study: Two approaches to enhance creative problem-solving in grade five students. B.C. Journal of Special Education, 7, (2), 129-152.

Henk M. van der Ploeg (1984). Worry, intelligence and academic behavior in Dutch school children. In R. Schwazer (Ed.). The self in anxiety, stress and depression. (pp.115-124). Elsevier Science Publishing Company Inc. North-Holland, Amsterdam, New York, Oxford.

Houtz, J.C. and Feldhusen, J.F. (1976). The modification of fourth graders' problem solving abilities. The Journal of Psychology, 93, 229-237.

Houtz, J.C. and Feldhusen, J.F. (1977). Training problem solving skills in fourth-graders: Supplementary analysis. The Journal of Psychology, 96, 309-313.

Houtz, J.C., Rosenfield, S. and Tetenbaum, T.J. (1978). Creative thinking in gifted elementary school children. Gifted Child Quarterly, 22, (4), 513-519.

Howley, A., Howley, C.B., & Pendarvis, E.D. (1986). Teaching gifted children. Little, Brown and Company: Canada.

Jung, C.G., (1954). The gifted child. In H. Read, M. Fordham, and G. Adler, (Eds.). The collected work of C.G. Jung (vol 17). New York: Pantheon Books.

Karnes, F.A. and D'Ilio, V.R. (1989). Leadership positions and sex role stereotyping among gifted children. Gifted Child Quarterly. 33, (2), 76-79.

Khatena, J. (1982). Educational psychology of the gifted. New York, NY: John Wiley.

Khatena, J. (1983). What schooling for the gifted. Gifted Child Quarterly, 27, (2), 51-56.

Khatena, J. (1984). Imagery and creative imagination. Buffalo, NY: Bearly and Creative Education Foundation.

Landau, E. (1976). Children ask questions about the future of mankind In Gibson, J. and Chennels, P. (Eds).

Gifted children looking to their future. pp. 268-275).
    London: Latimer.

Lazarus, R.S. (1966). **Psychological stress and the coping**
    process. New York, NY: McGraw-Hill.

Ludlow, B.L. and Woodrum, D.T. (1982) Problem solving
    strategies of gifted and average learners on a multiple
    discrimination task. Gifted Child Quarterly, 26, (3),
    99-104.

Ludwig, G. and Cullinan, D. (1984). Behavior problems of
    gifted and nongifted elementary school girls and boys.
    Gifted Child Quarterly. 28, (1) 37-40.

Maccoly, E., and Jacklin, C.N. (1974). The psychology of sex
    differences. Stanford, CA: Stanford University Press.

Maker, C.J. (1982). Curriculum development for the gifted.
    An Aspen Publication. Aspen Systems Corporation, Aspen
    Systems Corporation, Rockville, Maryland, London.

Milgram, R.H. and Milgram, N.A. (1976). Personality
    characteristics of gifted Israeli children. The Journal
    of Genetic Psychology, 129, (2), 185-194.

Morris, L.W. and Davis, M.A. and Hutching, C.H. (1981).

Cognitive and emotional Components of Anxiety; Literature Review and a Revised Worry-Emotionally Scale. Journal of Educational-Psychology. 73 (4) 541-555.

Newell, A. and Simon. H.A. (1972). Human problem solving. Englewood Cliffs. NJ: Prentice Hall.

Nezu, A.M. (1985). Differences in psychological distress between effective and ineffective problem solvers. Journal of Counselling Psychology, 32, (1), 135-138.

Nezu, A.M. (1986). Negative life stress and anxiety: Problem solving as a moderator variable. Psychological Reports, 58, (1), 279-283.

Nottelman, E.D. (1975). Test anxiety and off-task behaviour in evaluative situations. (ERIC DOCUMENT REPRODUCTON SERVICE No. 113022).

Ortar, G. and Morieli, A. (1973). Milta Intelligence Scale, Jerusalem. Israel: Hebrew University School of Education and Israel Ministry of Education. (in Hebrew).

O'Tuel, F.S. (1989). Sex differences on the structure of intellect (SOI-LA) Gifted Screening Form. Gifted Child Quarterly, 33, (2), 73-76.

Parnes, S.J. (1967). Creative behavior guidebook. New York: C. Scribner and Sons.

Perrone, P.A. and Male, R.A. (1981). The developmental education and guidance of talented learners. Rockville, MD: Aspen Systems Corp.

Perrone, P.A. (1985). Differential characteristics of gifted and talented elementary school students. Roeper Review, 7, U(3), 190-192.

Prystav, G. (1979-80). Predictability and controllability of aversive stimuli as stress-inducing variables. Archiv-fur- Psychologie, 132, (2), 121-138.

Renzulli, J.S. (1977). The enrichment triad model: A guide for developing defensible programs for the gifted and talented. Wethersfield, Conn: Creative Learning Press.

Renzulli, J.S. (1978). What makes giftedness? Phi Delta Kappa, 60, 180-184.

Renzulli, J.S. (1983). Guiding the gifted in the pursuit of real problems: The transformed role of the teacher. Journal of Creative Behaviour, 17, (1), 49-59.

Reynolds, C.R. and Bradley, M. (1983). Emotional stability of intellectually superior children versus nongifted peers as estimated by chronic anxiety levels. school psychology Review, 12, (2) 190-194.

Reynolds, C.R. (1985). Multitrait validation of the Revised Children's Manifest Anxiety Scale for Children of High intelligence. Psychological Reports, 56, (2), 402.

Roeper, A. (1982). How the gifted cope with their emotions. Roeper Review 5, (2), 21-24.

Roome, J.R. and Romney, D.M. (1985). Reducing anxiety in gifted children by inducing relaxation. Roeper Review, 7, (3), 177-179.

Rosenfield, S. and Houtz, J.C. (1977). Developmental patterns in problem solving and creative thinking abilities in gifted elementary school children. Paper presented at the Annual meeting of the American Educational Research Association. New York, NY. ERIC Document Reproduction Service No. 140529).

Sarason, S.B., Davidson, K.S., Lighthall, F.F., Waite, R.R., and Ruebush, B.K. (1960). Anxiety in elementary school children. New York, NY. John Wiley.

Schafer, W. (1978). <u>Stress, distress, and growth.</u> CA: Responsible Action.

Schill, T. (1984). Construct validation of a method for defining efficient and inefficient coppers. <u>Psychological Reports,</u> 54, <u>(3),</u> 969-970.

Scholwinski, E. and Reynolds, C.R. (1985) Dimensions of anxiety among high IQ children. <u>Gifted Child Quarterly,</u> 29, <u>(3),</u> 125-130.

Selye, H. (1983). The stress concept: Past, present and future (pp.1-20). In Cooper, C.L. (Ed.). <u>Stress research</u> New York, NY: John Wiley.

Shafran, E. (1989). The gifted in the Kibbutz Movement, Facts and opinions. (Hebrew). <u>Hachinuch Hameshutaf,</u> 131, 62-74.

Shore, B.M. and Dover, A.C. (1987). Metacognition, intelligence and giftedness. <u>Gifted Child Quarterly,</u> 31, <u>(1),</u> 37-39.

Sieber, J.E. (1970). Effect of memory support of the problem solving ability of test anxious children. <u>Journal of Educational Psychology,</u> 61, <u>(2),</u> 159-168.

Simon, H.A. and Barenfeld, M. (1979). Information processing analysis of perceptual processes in problem solving. In H.A. Simon (Ed.) Models of thought. (pp.363-372). New Haven, CT: Yale University Press.

Simon, H.A. (1981). Information processing models of cognition. Journal of the American Society for Information Science, 32, 364-377.

Spielberger, C.D. (1972). Anxiety as an emotional state. In C.D. Spielberger (Ed.). Anxiety: Current trends in theory and research. (pp.23-49). New York, NY: Academic Press.

Spielberger, C.D., Edwards, C.D., Lushene, R.E., Montuori, J. & Platzek, D. (1973). Preliminary Test Manual for the State-Trait Anxiety Inventory for Children. Palo Alto, California, Consulting Psychologists Press.

Spielberger C.D. (1976). The nature and measurement of anxiety. In C.D. Spielberger & R. Diaz-Guerrero (Ed.), Cross-cultural anxiety. Washington, DC: Hemisphere Pub. Co., New York: Distributed by Halsted Press.

Spielberger, C.D. (1980). Manual for the State-Trait Anxiety Inventory. Palo Alto, CA: Consulting Psychologists Press.

Sternberg, E.P. (1983). Problem complexity and the transfer of strategies in computer-presented problems. <u>American Educational Research Journal,</u> 20, 13-28.

Sternberg, R.J. (1984). What should intelligence tests test? Implications of a triarchic theory of intelligence for intelligence testing. <u>Educational Researcher,</u> 13, 5-15.

Sternberg, R.J. (1985). Critical thinking: Its nature, measurement and improvement. In F.R. Link, (Ed). <u>Essays on the intellect.,</u> Alexandria, VA: Association for Supervision and Curriculum Development.

Sternberg, R.J. and Davidson, J.E. (1986). <u>Conception of Giftedness.</u> Cambridge: Cambridge University Press.

Sternberg, R. J. (1986). Inside Intelligence, <u>American Scientist,</u> 74, 137-143.

Taichman, Y. and Malinek, C. (1984). <u>S.H.M.T. (STAIC); A questionnaire for the assessment of state anxiety and trait anxiety</u> (Hebrew). Tel-Aviv University.

Taylor, J.A. (1953). Manifest Anxiety Scale (MAS). <u>Journal of Abnormal and Social Psychology,</u> 48, <u>(2),</u> 285-290.

Taylor, J.A. (1968). Children Manifest Anxiety Scale. _Educational and Psychological Measurement._ 28, 1189-1192.

Tennenbaum (1991). _Characteristics of Giftedness._ Paper presented in the Conference on Excellence in Education. Jerusalem, Israel, June 1991.

Thorensen, C.F. and Eagleston, J.R. (1983). Chronic stress in children and adolescents. _Theory and Practice,_ 22, _(1),_ 48-56.

Torrance, E.P. (1962). _Guiding creative talent._ Englewood Cliffs, NJ; Prentic Hall.

Torrance, E.P. (1965). _Constructive behaviour: Stress, personality, and mental health._ Belmont, CA: Woodsworth.

Torrance E.P. (1980). Psychology of gifted children and youth. In W.M. Cruickshank (Ed.), _Psychology of exceptional children and youth._ (4th Ed.). (pp. 528-564). Englewood Cliffs, NJ: Prentice-Hall.

Torrance, E.P. (1986). Glimpses of the "Promised Land". _Roeper Review,_ 8, _(4)_ 246-251.

Treffinger, D.L. (1982). Myth: We need to have same scores for everyone! Response. <u>Gifted Child Quarterly,</u> 26, <u>(1)</u>, 20-21.

Treffinger, D.J. (1986) Research on creativity. <u>Gifted Child Quarterly,</u> 30, <u>(1)</u>, 15-19.

Trumbull, R. (1976) Cultural aspects of stress. (pp.131-140). In I.G. Sarason and C.D. Spielberger, (Eds.), <u>Stress and anxiety.</u> Washington, D.C: Hemisphere.

U.S. Commissioner of Education. (1972). <u>Education of the gifted and talented: Report to the Congress of the United States.</u> (CLPW Publication No. 81-102947). Washington, D.C. U.S. Government Printing Office.

U.S. Office of Education. (1976). <u>Program for the gifted and talented.</u> The Federal Register, 18665-18666.

Vygotsky, L.S. (1978). Problems of methods In V.J. Steiner, E. Souberman, M. Cole, & S. Scribner, (Eds.) <u>Mind in Society: The Development of higher psychological processes.</u> (pp.58-75). Harvard University Press. Cambridge Mass. London England.

Wallach, M.A. and Kogan, N., (1965). <u>Modes of thinking in young children: A study of the creativity -</u>

intelligence distinction. New York, NY: Holt, Rinehart
and Winston.

Wen-Ching Lin (1981). In Kuo, Wei-Fan (ed.). Special classes
for the gifted and talented: A review of research in
the Republic of China. (Taiwan). Paper presented at the
World Conference of Gifted and Talented Children. (4th,
Montreal PQ, Canada). ERIC Document Reproduction
Service No. 212119.

Weatley, G.H. (1984). MEPS Technical Report 84.01, Purdue
University. School Mathematics and Science Center.

West, C.K. (1969). The influence of test anxiety on the
selection of relevant from irrelevant information.
Journal of Educational Research, 63, (2), 51-52.

Whimbey, A. (1980). Students can learn to be better problem
solvers. Educational Leadership, 37, 560-565.

Whitmore, J.R. (1980). Giftedness, conflict and
underachievement. Melrose, Mass: Allyn & Bacon.

Whitmore, J.R. (1986). Understanding a lack of motivation to
excel. Gifted Child Quarterly, 30, (2), 66-69.

Woods, D.R. (1988). Problem solving corner: Books, courses, research. Journal of College Science Teaching, 17, (3), 243-245.

Wooding, G.S. and Bingham, R.D. (1988). Gifted Children's Responses to a Cognitive Stressor. Gifted Child Quarterly, 32, (3), 330-334.

Wu-Tien, (1981). in Kuo Wei-Fan (Ed.). Special classes for the gifted and talented: A review of research in the Republic of China. (Taiwan). Paper presented at the World Conference on Gifted and Talented Children. (4th, Montreal PQ, Canada). (ERIC Document Reproduction service No. 212119).

Zachman, L., Jorgensen,C., Huisingh, R., and Barrett, M., (1984). Test Of Problem Solving (TOPS). Moline, IL 61265. LinguiSystems, Inc.

Zeidner, M. (1988). Enhancing students' test coping skills: Report of a psychological health education program. Journal of Educational Psychology, 80, (1), 95-101.

APPENDICES

Appendix A:

Anxiety measurements: TAI and SAI

HOW-I-FEEL QUESTIONNAIRE

Developed by C. D. Spielberger, C. D. Edwards, J. Montuori and R. Lushene
STAIC FORM C-1

159

NAME_____ AGE_____ DATE_____

DIRECTIONS: A number of statements which boys and girls use to describe themselves are given below. Read each statement carefully and decide how you feel *right now*. Then put an X in the box in front of the word or phrase which best describes how you feel. There are no right or wrong answers. Do not spend too much time on any one statement. Remember, find the word or phrase which best describes how you feel right now, *at this very moment*.

1.	I feel	☐ very calm	☐ calm	☐ not calm
2.	I feel	☐ very upset	☐ upset	☐ not upset
3.	I feel	☐ very pleasant	☐ pleasant	☐ not pleasant
4.	I feel	☐ very nervous	☐ nervous	☐ not nervous
5.	I feel	☐ very jittery	☐ jittery	☐ not jittery
6.	I feel	☐ very rested	☐ rested	☐ not rested
7.	I feel	☐ very scared	☐ scared	☐ not scared
8.	I feel	☐ very relaxed	☐ relaxed	☐ not relaxed
9.	I feel	☐ very worried	☐ worried	☐ not worried
10.	I feel	☐ very satisfied	☐ satisfied	☐ not satisfied
11.	I feel	☐ very frightened	☐ frightened	☐ not frightened
12.	I feel	☐ very happy	☐ happy	☐ not happy
13.	I feel	☐ very sure	☐ sure	☐ not sure
14.	I feel	☐ very good	☐ good	☐ not good
15.	I feel	☐ very troubled	☐ troubled	☐ not troubled
16.	I feel	☐ very bothered	☐ bothered	☐ not bothered
17.	I feel	☐ very nice	☐ nice	☐ not nice
18.	I feel	☐ very terrified	☐ terrified	☐ not terrified
19.	I feel	☐ very mixed-up	☐ mixed-up	☐ not mixed-up
20.	I feel	☐ very cheerful	☐ cheerful	☐ not cheerful

NAME _____ AGE _____ DATE _____160____

DIRECTIONS: A number of statements which boys and girls use to describe themselves are given below. Read each statement and decide if it is *hardly-ever*, or *sometimes*, or *often* true for you. Then for each statement, put an X in the box in front of the word that seems to describe you best. There are no right or wrong answers. Do not spend too much time on any one statement. Remember, choose the word which seems to describe how you usually feel.

1.	I worry about making mistakes	☐ hardly-ever	☐ sometimes	☐ often
2.	I feel like crying	☐ hardly-ever	☐ sometimes	☐ often
3.	I feel unhappy	☐ hardly-ever	☐ sometimes	☐ often
4.	I have trouble making up my mind . . .	☐ hardly-ever	☐ sometimes	☐ often
5.	—It is difficult for me to face my problems .	☐ hardly-ever	☐ sometimes	☐ often
6.	I worry too much	☐ hardly-ever	☐ sometimes	☐ often
7.	I get upset at home	☐ hardly-ever	☐ sometimes	☐ often
8.	I am shy	☐ hardly-ever	☐ sometimes	☐ often
9.	I feel troubled	☐ hardly-ever	☐ sometimes	☐ often
10.	Unimportant thoughts run through my mind and bother me	☐ hardly-ever	☐ sometimes	☐ often
11.	I worry about school	☐ hardly-ever	☐ sometimes	☐ often
12.	I have trouble deciding what to do . . .	☐ hardly-ever	☐ sometimes	☐ often
13.	I notice my heart beats fast	☐ hardly-ever	☐ sometimes	☐ often
14.	I am secretly afraid	☐ hardly-ever	☐ sometimes	☐ often
15.	I worry about my parents	☐ hardly-ever	☐ sometimes	☐ often
16.	My hands get sweaty	☐ hardly-ever	☐ sometimes	☐ often
17.	I worry about things that may happen . .	☐ hardly-ever	☐ sometimes	☐ often
18.	It is hard for me to fall asleep at night .	☐ hardly-ever	☐ sometimes	☐ often
19.	I get a funny feeling in my stomach . . .	☐ hardly-ever	☐ sometimes	☐ often
20.	I worry about what others think of me ..	☐ hardly-ever	☐ sometimes	☐ often

Appendix B

Real Life Problem Solving Situations Set (RLPSSS)

girl ()   boy ()

Name _____

School _____

Class _____

In front of you are a number of pictures. Look at each
picture carefully and answer the accompanying questions.

For each question, there could be more than one
possible answer.

If you do not have enough space to answer, you may
continue your answer on the back of the page. Please
remember to write the number of the question with the
continuation of your answer.

Thank you for your cooperation.

Enjoy!!!
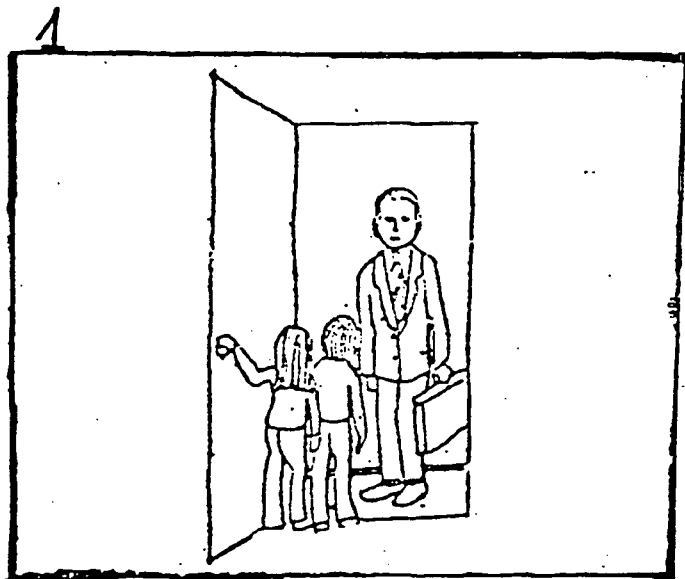
The children hear a knock at the door of their home. They open the door despite the warning of their parents not to do so. A stranger is standing there.

a) What are the problems this situation creates?

b) Suggest ways to solve these problems. (What would you advise these children to do in this situation?)

c) What could have been done in order to prevent this situation? (Think of several suggestions).

Please answer on the back of the page.

2
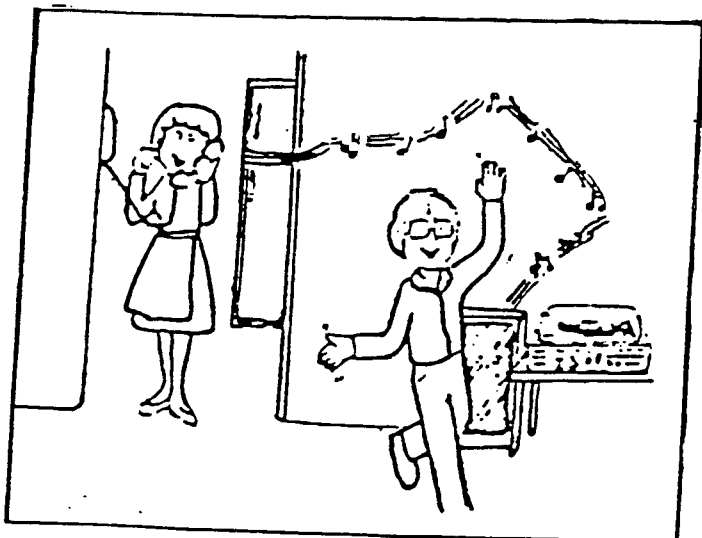
a) How do we know that the mmother has difficulties talking on the telephone?

b) Why is the boy playing the music at such a high volume?

c) Why should the boy not play the music at high volume?
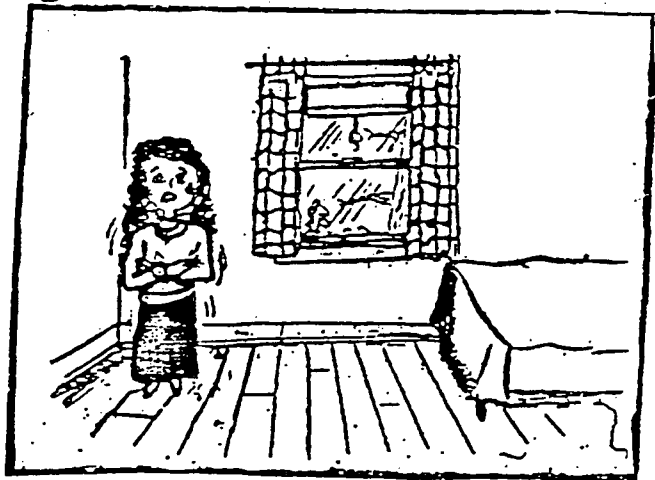
This girl lives in an apartment building in which the heating is not manually controlled. An hour after she came home from school, she started to feel cold.

a) What, in your opinion, are the possible reasons for her feeling cold?

b) What would you do in her situation in order to warm up?

c) Suggest ways for preventing such a situation from happening in the future.

4
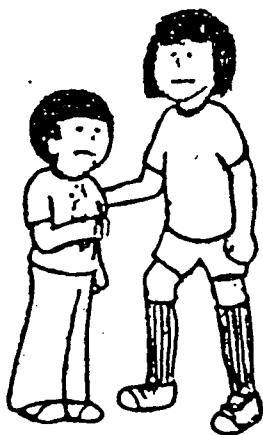
a) How does the girl know that her brother has eaten a popsicle?

b) What caused the popsicle to drip?

c) Why won't the sister let her brother hold her hand now?

d) The popsicle dripped on the boy's shirt. What could the boy have done to prevent his shirt from getting dirty?
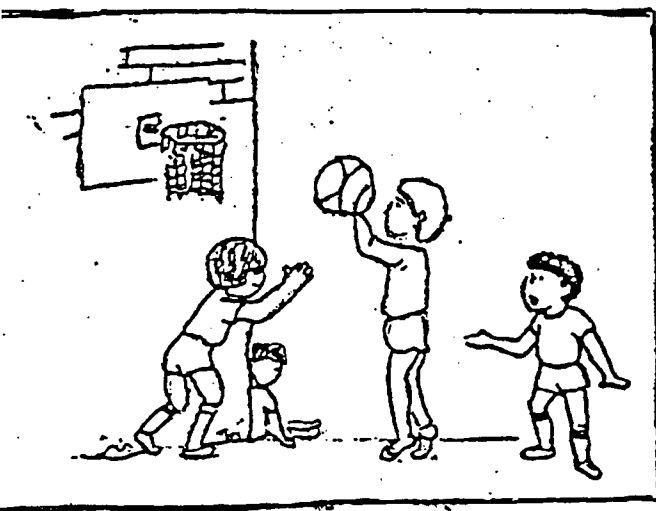
5
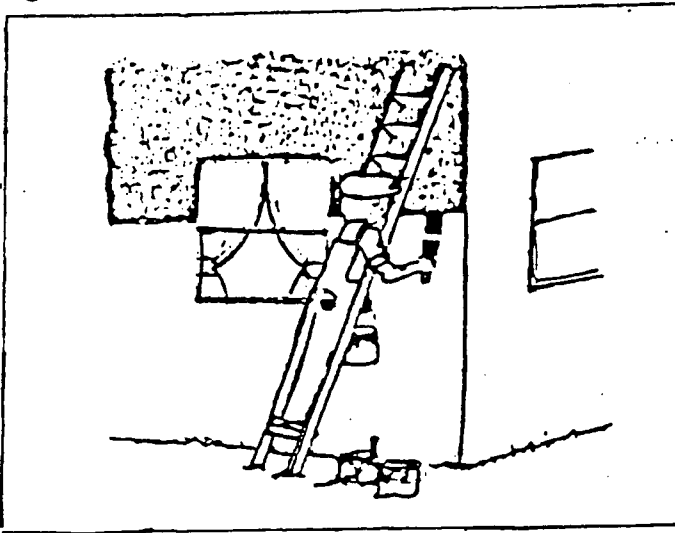
a) How can you tell this house is being painted?

b) Why is it not recommended to shake the painter's hand right now now?

c) What can the painter do if he dislikes the color he is asked to use?

d) The painter was not careful enough and spilled paint on the lawn. What could he have done to prevent this from happening?
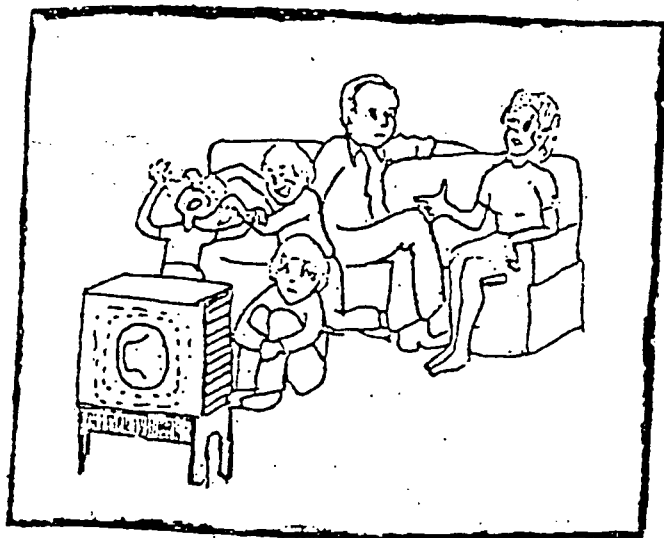
6

a) How do you know that the children are playing just for fun, rather than a real game of basketball?

b) Why aren't the children playing with more than one ball?

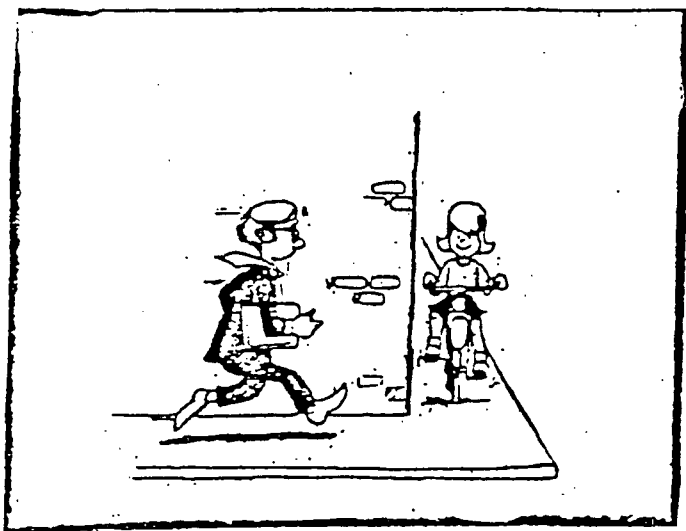c) The boy sitting down wants to play. What can he do in order to join the game?

7

The boy sitting in front of the television loves the program. However, we can see from the picture, that he is having a difficult time.

a) What do you think are the reasons for his difficulties?

b) What can he do to enjoy the rest of the program?

c) Suggest ways to prevent such a situation in the future.

8

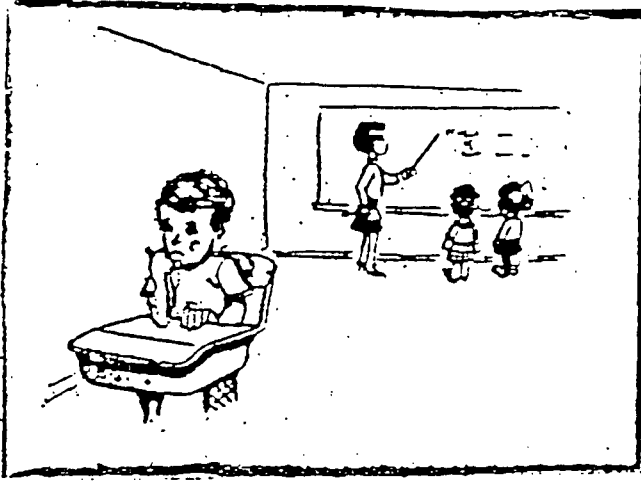The man in the picture is in a hurry. Around the corner, a girl is riding a bicycle.

a) What problems does the man face?

b) What problems does the girl face?

c) Recommand a solution for the man to avoid his problem.

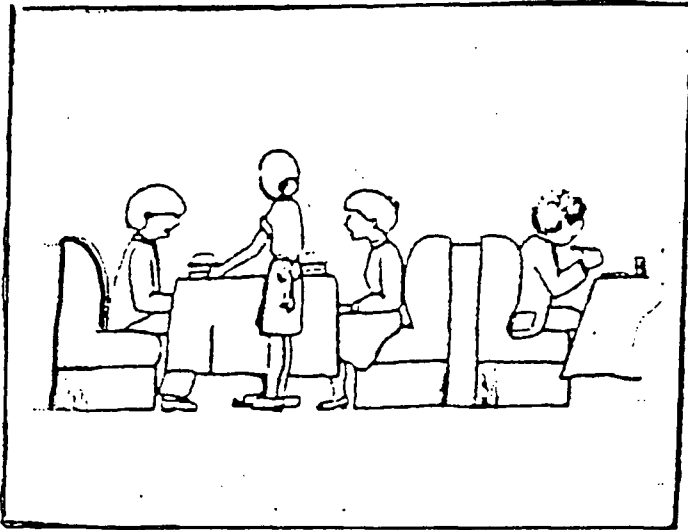d) Recommand a solution for the girl to avoid her problem.

9

During recess after a difficult Math test the teacher is explaining to two students how the problem should have been solved. The boy sitting looks sad.

a) Give possible reasons for the student's bad mood.

b) How can the student make himself feel better?

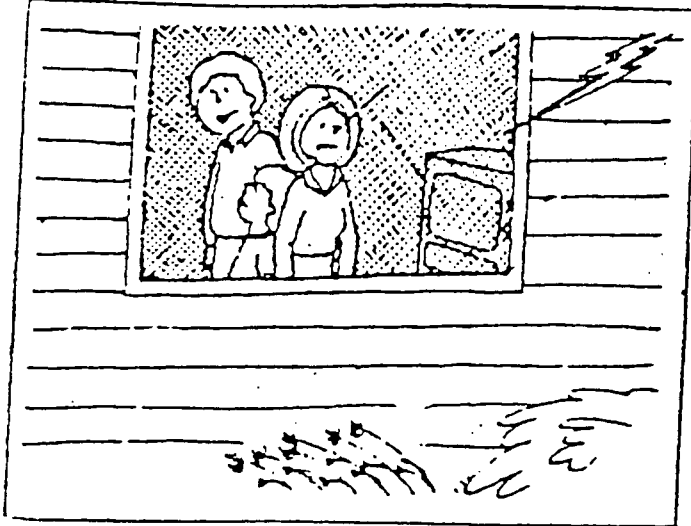c) Suggest different ways to prepare for an Math test.

a) How can you tell the couple is at a restaurant?

b) Why did they decide to go to a restaurant?

c) Why don't they have to wash dishes after the meal?

d) They ordered a hamburger and fries; the waitress brought them a pizza. What could they do?

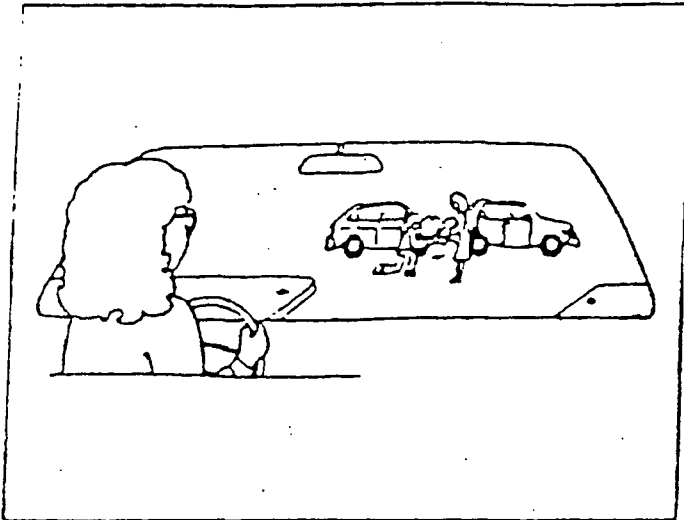e) What could the waitress have done to prevent her mistake?

11

a) How does this family know that there is a blackout?

b) What could be the reason for the blackout?

c) What should the family do?

d) The family was not ready for the blackout. What should they do to be better prepared in the future?
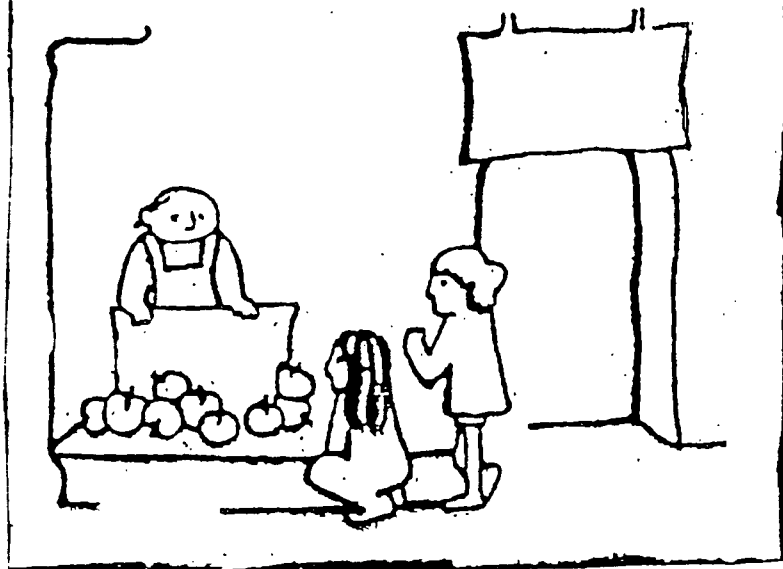
a) How do we know that there has been an accident?

b) How do you think the accident happened?

c) Why is there no ambulance?

d) What should this lady in the car do?

Two sisters were sent by their mother to buy a kilogram of apples. To their surprise, there was a sudden increase in the price of apples.

a) What, in your opinion are the reasons for this sudden increase in price?

b) What would you do if you were in the sisters' place?

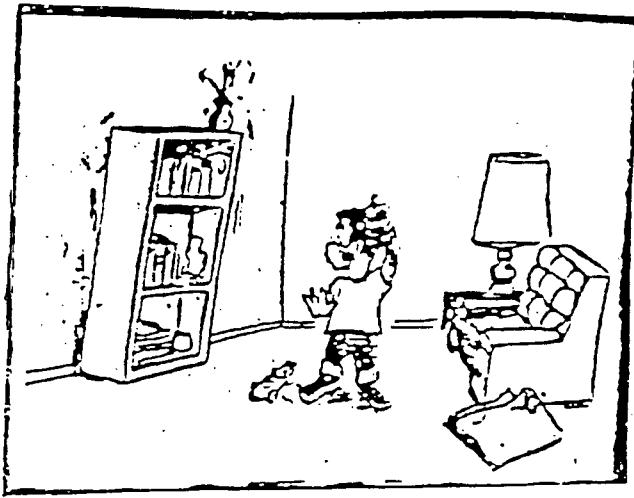c) What can consumers do to prevent unjustified increases in prices?
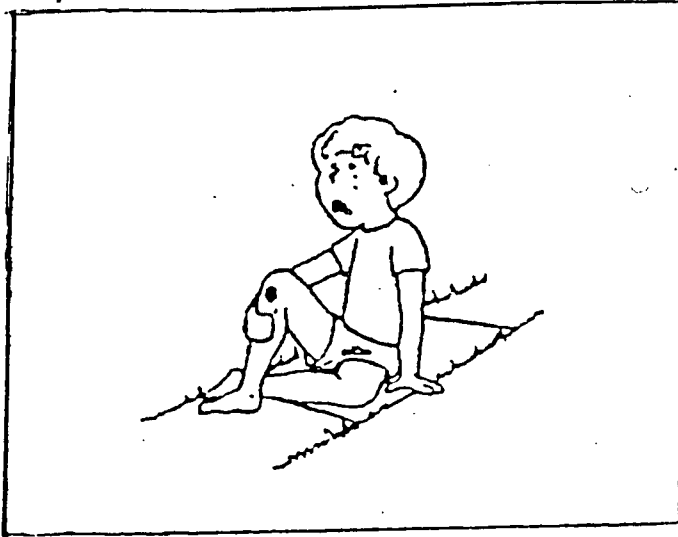
a) How do you know that the boy is hurt?

b) Why wan't he have to go to the hospital?

c) What should the boy do now?

The bookcase in the boy's room is tilting to the side.

a) Point out possible reasons why the bookcase is tilting.

b) What could the boy do to straighten the bookcase?

c) What would you do to prevent the bookcase from tilting to the side?
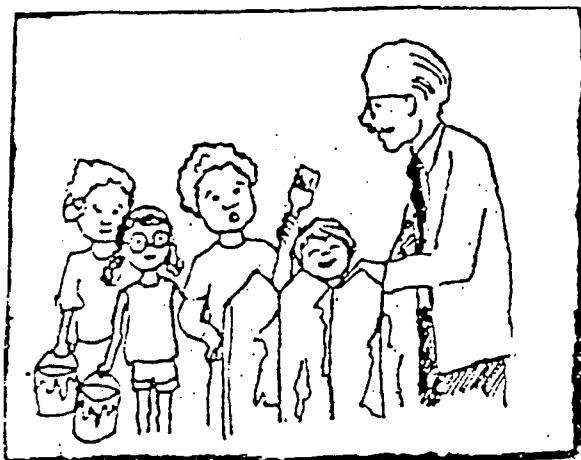
The man at the right hires
once a year a group of
children to paint his fence.

a) Why do you think the man decided that he needs his fence
painted once a year?

b) If you were one of the children, what questions would you
ask the man to make sure you were painting the fence the way
he wants it done?

c) What could the man do so that his fence does not need to
be painted so often?

Appendix C:

Sample of Students' Responses to Real Life Problematic Situations of the RLPSSS

SAMPLES OF THE DIFFERENT ANSWERS TO THE RLPSSS

SITUATION NUMBER 1.

1-A.

The man at the door is a person with negative intentions, (criminal, thief, rapist, terrorist, kidnapper, etc.). The children's problem is: how to avoid his entrance.

The man at the door is a nice person with friendly intentions, (friend of the family, relative from USSR, repair man, sales man, doctor, etc). Having opened the door in the first place creates the problem of insulting a good person by refusing his entrance.

The children's problem is how to say "NO"

The children failed to follow the parents' instructions, therefore they feel guilty.

The parents might not trust them in the future.

The parents might punish them.

1-B.

To ask the person to return later.

To apologize.

To call the parents and ask them if they know the person.

While one of the children talks to the person, the other one calls for help (parents, neighbors, friends, police).

Have the stranger leave a message for the parents, while he stays behind the door.

Take a risk and let him in.

1-C.

Learn self defense.

Make sure that there are more than two children at home.

Keep parents' instructions and never open the door.

Peek through the key hole (arrange special low peek hole).

To install a chain, small peeking window or some other device on the door for safety, so that the children communicate with the person without actually risking opening the door.

Have the parents instruct them as to whom they might expect.

To stay with: a babysitter, neighbor, or familiar adult.

To have a trained guard dog, alarm system, police number.

SITUATION NUMBER 2.

2-A.

Mother's facial expressions, (angry face, plugging one ear, etc.)

Music notes coming out of the radio.

2-B.

For the fun of it.

To enrage his mother, (neighbors).

To draw his mother's attention (to prevent her from talking so much on the phone.

The boy does not see (or hear) that his mother is talking on the phone.

He has hearing problems.

He is selfish and thinks just of himself.

2-C.

It bothers his mother, neighbors.

It may harm his ears.

It creates an atmosphere at home that nobody can talk quietly (concentrate on other things: watch TV, prepare homework, talk on the telephone etc.).

SITUATION NUMBER 3

3-A.

It is cold at home and the girl does not expend energy.

It is all in her mind (her exhaustion may cause her to feel cold, she may have failed an exam, she feels lonely and sad).

The girl wears no socks. when one's feet are cold the entire body is cold.

Central heating not functioning.

The girl is not dressed sufficiently.

The girl is sick.

3-B.

Use a blanket, or heavier clothes.

Be active (exercise to warm up, dance, play ball, run, etc.).

Imagine (a heater, summer, sunshine on the beach, pretend that it is not cold).

Eat and drink something hot.

Check the heating system.

Take a hot bath.

3-C.

Battery operated heater.

Prepare warm clothes and blankets.

Ensure a well functioning heating system.

Practice exercising.

Build a club house to which one can go when there is a problem.

To coordinate with other tenants and ensure that the heating system works all day.

SITUATION NUMBER 4.

4-A.

A stain on the shirt (he looks dirty).

She can smell the smell of the popsicle.

He is teasing her that he ate a popsicle and she didn't.

4-B.

The heat of the sun.

He ate too slowly.

His body heat caused the popsicle to melt quickly.

4-C.

His hand is sticky and dirty.

She is angry that he didn't share the popsicle with her.

She wants to teach him a lesson to learn what may happen when he gets dirty.

4-D.

Be careful, may take off his shirt.

Eat faster.

Eat in the shade.

To bend forwards so the popsicle doesn't drip on his shirt.

To share it with his sister so they finish before it drips.

SITUATION NUMBER 5

5-A.

A painter stands on a ladder, holding a brush and paint buckets.

Only half the house is painted so far.

Smell the color.

Paint is dripping.

5-B.

Our hand will get dirty.

The painter shouldn't be distracted.

The painter might fall off the ladder.

He seems strong; his handshake may be painful to you.

5-C.

He has no choice; he is being paid for a job.

May suggest a different colour, try convincing the owner.

Can quit the job, have someone else substitute for him.

To pretend that this is a colour he likes, or ignore it all together.

To add a different colour of his liking to the window frames.

To put gloves in order to keep his hands clean.

To demand a higher price.

5-D.

Be careful.

Protect the lawn with newspapers or plastic sheets.

Clean afterwards.

Make the owner responsible for protection of the lawn.

To apologize and compensate the owner.

Situation Number 6

6-A.

There is neither a judge or a trainer, nor an adequate court.

Only three (3) players.

They don't include the boy in the corner.

Only one basket rather than two.

No audience.

They don't seem like serious players (no uniform, shouting, one boy sitting lose to the basket, don't follow the rules).

6-B.

There is only one ball.

They just play for fun or practice.

A second ball may cause confusion.

6-C.

He should ask to be included.

Let him offer another ball.

Pick up the ball if it is thrown far away.

Suggest that it is unfair to play 2 against 1, if he joins they will play 2 against 2.

To bribe the kids (let them ride his bike, etc.).

Join them naturally.

Act as a judge, encourage them and teach them some tricks.

SITUATION NUMBER 7

7-A.

His family is noisy and disturbs him.

He does not understand the movie, (foreign language, open the TV in the middle of the movie etc.).

He does not see well, (needs glasses).

He is preoccupied.

His favorite hero dies.

He failed in school and his parents are angry with him.

He is experiencing social difficulties with his classmates.

The movie is about to end.

He deserves it. He disturbed his family and now they take revenge.

His family is not considerate.

7-B.

Ask his family to keep quiet, or leave the room.

Stop being sad, it's just a movie.

Ask his parents to translate the movie.

Get his eyes checked.

Raise the volume of the T.V.

Try to raise his family's interest in the program.

Record the program on video and watch it later on.

7-C.

Get eye glasses.

Make sure that his family is more considerate.

Retaliate. Disturb them when they are watching a program.

Decide not to argue of fight in front of the T.V.

Arrange a T.V. watching schedule for everyone in the family.

To ignore the situation.

Practice his fast reading (for subtitles).

A family discussion on the subject of consideration for others.

Engage his siblings in a fun game so they won't bother him.

Be considerate toward his siblings so that they will learn to respect his needs and be considerate to him.

SITUATION NUMBER 8.

8-A.

He risks being hit by the bicycle.

He is late for work.

His documents are going to be scattered all over.

He is going to break his glasses.

He may bump into the girl and if she will hurt herself she may sue him.

He is running away because he stole the bag.

8-B

She risks hitting the man and hurting herself.

So far it does not seem like she has any problem.

The man may sue her.

She wants to get to school early so she can play.

She wants to break the record of speeding biking.

She may be stopped by the police who'll warn her not to ride on the side walk.

8-C

Get up earlier and allow more time.

"You are better off losing a minute in your life then your life in a minute"

Stop and wait in the corner.

Take a bus or a ride with a friend.

Get himself a proper bag for his papers.

Approach the municipales to widen the street.

Not to visit in the stockmarket.

8-D

Slow down and look around.

Increase speed and get to the corner before the man.

Ride on the street not the side walk.

Get herself a better bike.

SITUATION NUMBER 9.

9-A

He failed the test.

His girl friend left him.

His expensive pen broke.

He has no friends and is bored.

He is a gifted child who in case of failure, is in mourning.

He worries that his parents might be angry with him.

His parents are about to get divorced.

The teacher neglects him.

9-B

Forget about the exam.

Have the teacher, a friend, a parent, explain the problem to him.

Treat himself to something new (book, candy).

Think of all the tests in which he did well.

Have a private tutor.

Make peace with his friends.

9-C

Study well the material.

Study with a friend, parent, teacher.

Create Math games for fun.

Memorize all the rules.

Study all year, several hours a day.

Study the day before the exam, so that the material will be fresh in his mind.

SITUATION NUMBER 10.

10-A

There are chairs, tables, a waitresse, another couple.

By the way the food is served.

By the comfortable apholstary.

White table clothe, & a menu.

10-B

They are celebrating.

No food at home and the stores are closed.

They want to get to know each other.

They want to forget a sad experience.

They are on a trip and stopped for the meal.

They have important matters to discuss (like business, divorce).

10-C

It's being done by the staff, they paid for this service.

They are not at home.

They don't own the restaurant.

10-D

Eat the Pizza, but pay for the H. & C.

Ask the waitresse to bring H. & C.

Complain to the owner.

Leave the restaurant.

Tell her that she didn't listen to them.

10-E

Write down the order according to the table.

Recheck their order.

Tell them that they are out of H. & C.

Concentrate on her job.

Get a hearing aid.Get better organised.

Situation number 11

11-A

The TV does not work.

The house is dark.

There is a thunder-storm outside.

11-B

Thunder hit anelectric pole.

Branches fell on the electric pole.

A car hit the electric pole.

There is an overload in the electric company.

There is a short circuit.

There is a strike in the electric company.

The family didn't pay the electric bills, so the electric company shut-off their electricity.

The electric company is making repairs in the electric system.

There is an overload of electric appliances.

11-C

Call an electrician to fix the electicity.

Light a candle.

Turn on a flashlight.

Put on an emergency light.

Wait.

Replace the fuse.

Check what happened, whether it is a local problem or a general problem.

Call the electric company.

Try to fix the problem by themselves.

11-D

Prepare candles and matches.

Put an emergency light in a reachable place, just in case.
Listen to the weather forcast and when there is a storm
expected, to be prepared.

Buy a generator that will keep working when there is a
blackout.

Prevent over-usage of electricity at home.

To install an automatic fuse.

SITUATION NUMBER 12

12-A

Cars are very close to each other.

Cars are smashed.

Cars block the road.

There are pieces of glass on the ground.

A child is hurt and lying on the ground.

People are standing outside their car.

12-B

The drivers didn't keep enough distance between the cars.

The first car stopped unexpectadly and the second car
couldn't stop in time.

There was an unclear visIbility.

A pedestrian jumped into the road unexpectadly.

A child didn't crossed the road in a crosswalk.

The driver fell asleep.

The driver was drunk.

12-C

There was nobody badly hurt.

There was no one that could call an ambulance.

The ambulance hadn't arrived yet.

The ambulance had already left the place.

12-D

Stop the car.

Call for help.

Help calm down the two ladies.

Call the police, notify the child's parents, call a tow-car.

Not to do a thing.

Drive the child to the hospital.

To honk so they will clear the road.

SITUATION NUMBER 13.

13-A

Inflation.

There is no subsidy on apples.

The poor conditions for growing apples caused increased
expenses to the farmers.

The shop's competition went bankrupt.

The owner's daughter is getting married and he needs money.

It is not the apple season.

The salesman is cheating the girls.

13-B

Go home and ask for more money.

Bargain.

Buy the apples and sign an I.Q.U.

Buy apples somewhere else.

Do comparative shopping.

Buy less apples.

13-C

Stop coming to stores that raise prices.

Complain to the Government.

Buy in more than one store so that you can do comparative
shopping.

Demonstrate! Organize a demonstration.

Find out if the increase is justified.

Can't do anything about it.

Encourage more farmers to graw apples.

Buy apples on sale.

SITUATION NUMBER 14

14-A

He is crying calling for help.

We see a black spot on his knee.

He is bleeding.

He sits on the ground, on a strecher.

He holds his knee, can't walk.

14-B

Perhaps it's a superficial wound, small, not serious.

First you use first aid, only if that does not help you go
to the hospetal.

It seems as if he did not break anything, so it is enough to
clear the wound, sterilize it and put a bandage on it.

14-C

Go home.

Sterlize the wound, bandage it, stop the bleeding by
applying pressure to the wound.

Call for help, go to the school nurse if it happens in
school, to get treatment.

Ask a friend, a bypasser, to call home or to walk him home.

Crawl home, limp home, there his mother will treat the wound.

Keep crying and get attention.

Lie in bed and wait until the wound heals.

SITUATION NUMBER 15

15-A

It is built crooked

Somebody moved it.

The floor, wall, the base of the bookcase, the house is crooked.

The child climbed on it, pushed it.

The child took something out of it and pulled on it too hard.

On one side there are many books, on the other side it is empty.

The bookcase is old and therefore it doesn't have good balance.

One of its legs fell; it isn't built well.

Something fell behind, under the bookcase.

There was an earthquake.

Somebody hammered a nail on the other side of the wall.

That is the way the bookshelf is built.

The closet wasn't fastend with screws, the screws that held it to the wall are crocked.

There is a differance in the hight of the legs of the bookcase.

It is an old bookcase.

15-B

The child can't do anything.

Check what is the reason.

Push to the other side and try to p other side and try to

put it straight.

Balance the books, take down the load, push towards the wall.

Put a book under the bookcase, or fix a leg.

15-C

Put something beside it for support.

Construct a solid base for it.

Nail the bookcase to the wall behind it.

Find a flat surface to place the bookcase on.

Place the books on the selves, ensuring that their weight is spread evenly.

Not to put the bookcase in the child's room.

Replace the bookcase.

Put the heavy books on the lower shelf.

SITUATION NUMBER 16

16-A

Because the fence is dirty, doesn't look good and to avoide
rusting.

So it will look nice, new.

He doesn't like the colour.

Maybe the kids suggested him and he agreed so that the kids
will have something to do.

The colour holds for only one year.

That's the way it is expected to be.

He is poor and cannot manage to paint it more than once a
year.

16-B

Which colour would you like most for the fence?

Is there waterproof paint?

Why do y of us would you like to paint your fence?

Would you like something special?

Would you like us to paint both sides, how many layers, in what way?

How many colors do you want us to use?

To peel the old paint, or to paint on top of the old paint?

How big is the fence? How much color does it need?

How much money will we get?

When do you want us to finish painting?

How much paint should we buy? where is a good store to buy the paint?

Should we paint horizontally or vertically?

Should we paint something else too?

How much time should we work?

Which hours are convenient for you to have us working?

16-C

To grow some plants on the fence.

To put something on the fence that will keep it from rusting.

To clean the fence periodically.

To get a professional to do the painting instead of kids.

To take down the fence.