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Grief: Exploring Our
Innermost Sorrow

page 8

AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF MINNESOTA

Research on Home and Family Life

KEITH HUSTON
Director, Minnesota Agricultural
Experiment Station

ALMOST SINCE ITS beginning, the Experiment Station has sought to encourage, through research, a better understanding of home and family life. This issue of *Minnesota Science* reports some recent and fascinating research on these subjects.

At the turn of the century and through the following decades, rural leaders and legislators urged that some attention be directed to the home and family, though major emphases of the Station would be on agriculture and forestry. Thus, the Station's research in those areas, conducted primarily by the faculty of the College of Home Economics, has always comprised a modest, though important program.

In earlier years, major efforts were on gardening, food preservation, cooking, textiles, sewing, household management, furnishings, nutrition, and health, all related to daily activities in rural homes. Concerns about enhancing family life and relationships among family members have always existed. However, many doubted that such issues could be clarified through research. As this issue of the magazine shows, that attitude has changed dramatically in the last 10 years.

Today, strong programs in the traditional areas of research continue but with new directions. Scientists are addressing such important issues as energy conservation, housing in a world where space is ever more costly, consumer safety in food and clothing, and family economics in the modern setting. In addition, the Minnesota Experiment Station, through the College of Home Economics, has established a strong research effort into family life, relationships between family members, solutions to problems of various age groups, and special cultural issues, such as alcoholism, teenage pregnancy, and family stress.

This special issue of *Minnesota Science* marks the attainment by the College of Home Economics of the capability for high quality research in all major areas of home and family life.

MINNESOTA SCIENCE

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Cover: Grief over death or separation is a fundamental human experience which remains largely unexamined. Experiment Station research is providing new insights (see story on page 8). Photo by David Hansen.

Credits: Photo on page 8 courtesy of Gibbs Farm and Ramsey County Historical Society.

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Home Economics Research — Decade of Development

KEITH MCFARLAND
Dean, College of Home Economics

THROUGHOUT HISTORY people have been eager to learn about themselves and the world in which they live. But it has been less than a century since we began to apply the methods of empirical science to our efforts to understand the complex relationships between individuals and social systems. The College of Home Economics has played and continues to play a significant role in generating this scientific information. Home economics research strives to provide people with a fuller understanding of those elements that touch their lives; their food, clothing, shelter, and visual environment, as well as the subtleties of human relations and interactions. It helps to provide bases for intelligent decision making and to identify guidelines for action.

In 1969, the Agricultural Experiment Station support to home economics research totalled \$101,300, of which two thirds was in food science and nutrition. This constituted 2.9 percent of experiment station resources. By 1978-79, support to home economics totalled \$971,834 or 10.1 percent of total experiment station resources. Other support sources increased research funding for the College of Home Economics to \$1.4 million.

This ten-fold growth came about primarily as a result of a conscious decision by the home economics faculty to broaden its scope, with research productivity becoming a defined part of the College mission. Administrative policies within the departments

and the College have influenced staff recruitment so replacement staff positions are being filled with specialists who have research as well as teaching competencies. And, whenever possible, teaching loads are being adjusted to provide time and energy for research participation.

Increased leadership and support from the Agricultural Experiment Station have provided the stimulus for and stability in research planning. An increased awareness of the role of housing, food and nutrition, clothing, and psycho-social relationships in the welfare of rural communities has influenced federal and state funding sources. Also important to the expanded research effort has been the completion of the home economics building program and the addition of well-equipped laboratories.

Especially noteworthy in this strengthening process has been Dr. Signe Betsinger, associate dean of the college and assistant director of the Agricultural Experiment Station. She has influenced home economics research growth through such activities as identifying sources of support, counseling potential faculty investigators, and shaping support for existing projects.

Rapid change has characterized the 1970's, and the greater sensitivity of the public to the welfare of individuals and families suggests that the need for home economics research will grow rather than decline. Our challenge is great.



In Pursuit of the Family

JENNIFER OBST
Department of Information
and Agricultural Journalism

THE AMERICAN FAMILY has been studied, discussed and analyzed. It has been both maligned and honored; its death announced periodically by the press. Poets and novelists have attempted to define and understand the family.

To scientists, the family poses several exasperating, yet complex problems.

For how can you scientifically study something as elusive, personal, and complex as the family? How can you find an objective definition? The family, after all, is not a subject that can be isolated in the laboratory or dissected and examined under a microscope. It is a collection of people brought together by birth and/or choice. Family members are a group of people who can talk back, assess themselves, have conflicting perceptions, and come to contradictory conclusions.

So how can you effectively and accurately understand the family? David H. Olson, professor of family social science at the University of Minnesota, has been trying to find out.

"Most family research done in the past has consisted of asking people how they viewed their families. Usually the researcher questioned the person who was most available, and generally that has been the wife. As a result, 90 percent of the family research information we have reflects a wife's perspective.

"Recent studies show, however, that various family members describe their family differently. Not only that, but a member's description of the family and his or her own behavior in it may be contradictory." Obviously, the more forms of information researchers can get from and about families, the better their chances of getting an accurate picture.

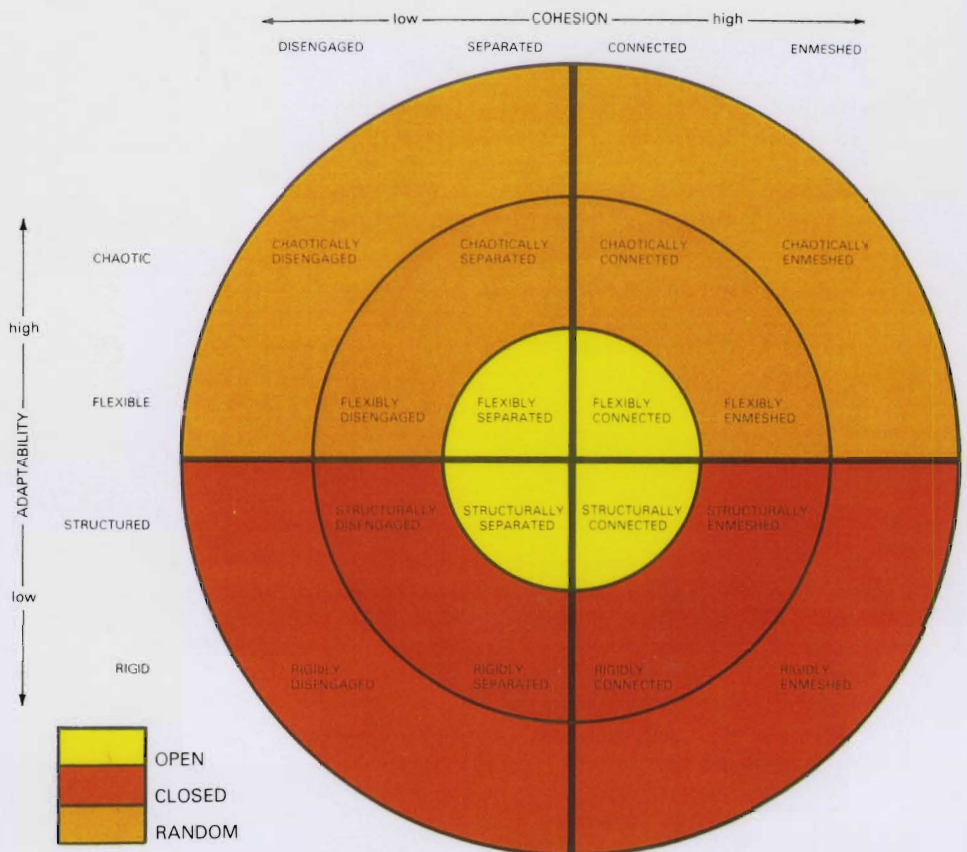
Another reason why it is difficult to study the variables in family social science is that, as Olson insists, the family must be viewed as a system — something that grows and changes. No static definition or descriptions of families will do.

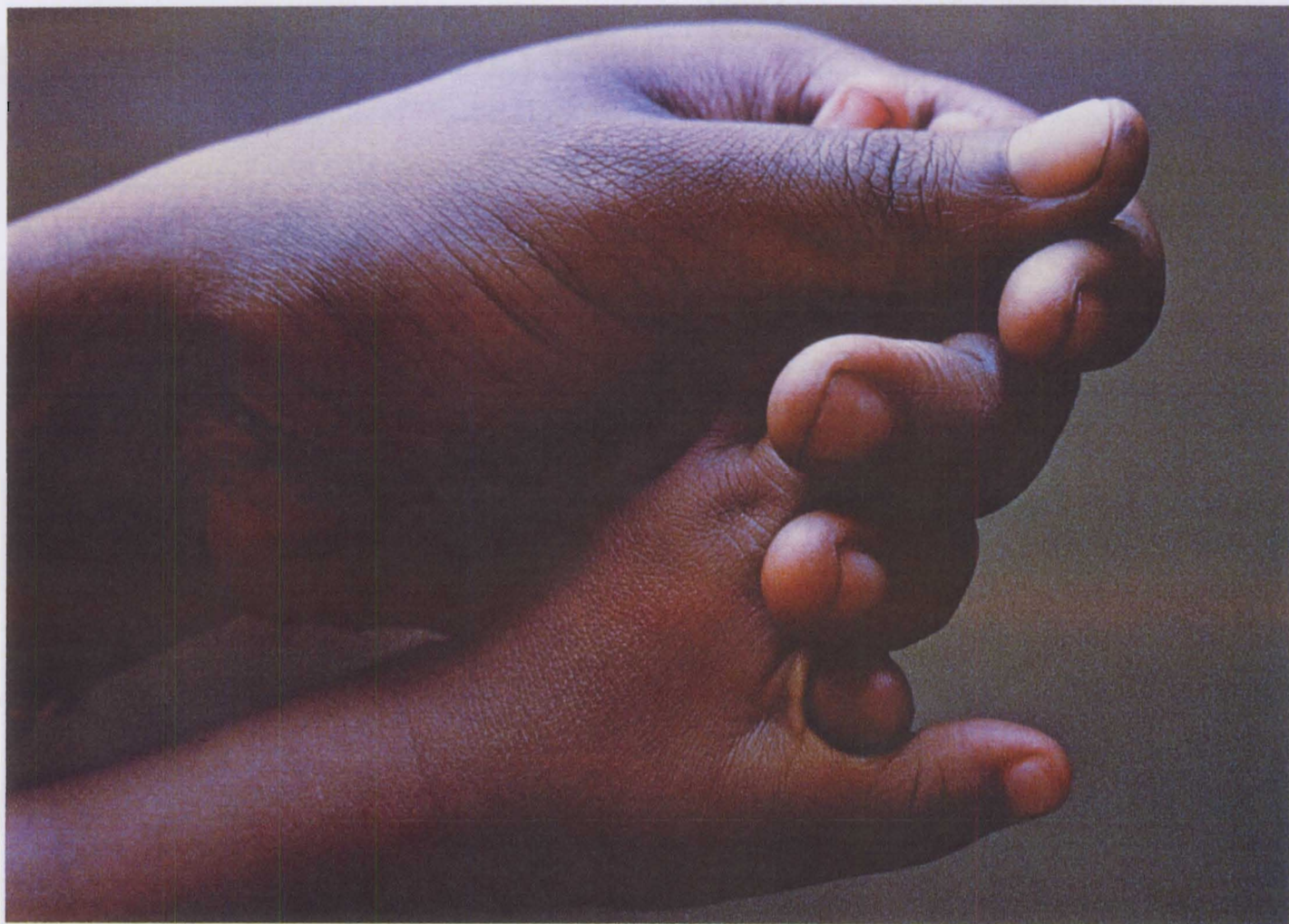
But defining a changeable beast only makes the challenge more interesting. To do so, Olson has developed two concepts. "There are two central dimensions that explain a great deal of family behavior — not everything, but they're very important. These are *cohesion* and *adaptability*." Cohesion is the ability of family members to support each other, and adaptability is a family's ability to adjust to change.

"One of the discoveries we have made with our research is that a family that exhibited too much or too little of the two attributes seemed to have problems," Olson pointed out. For example, a family with low cohesion experiences the stress of alienation and indifference, while a family with too much cohesion finds itself under the opposite kind of stress. Here, family members want more freedom from the family. Problems were also observed in families in the extremes of adaptability. A family with too much was chaotic, one with too little was rigid.

"The second discovery we made was that by putting these two central dimensions together

Figure 1. Sixteen Possible Types of Marital and Family Systems





Studies show that a member's description of his family and his own behavior in it may be contradictory.

on what we call a circumplex, we were able to define groups or types of families (figure 1). Through analysis of several family types over the past four years we have consistently seen that problem families tend to be in the extreme parts of the model. Not only that, but their initial response to therapy is not to move to the middle, but to flip to the opposite extreme. A chaotic family, then, will become rigid.

"Healthy families, on the other hand, fall into the center of the circle. They are balanced. When changes occur, such as a death in the family or a new baby, they may become more extreme (enmeshed or chaotic) initially, but they readjust and move to the center."

It is not surprising that the family, one of the most basic systems of nature, operates according to one of the most basic rules of nature — it works better when opposing forces are balanced.

"The great value of this model is that we can then talk about family types. We can begin to create useful definitions — useful not only to the researcher, but to the therapist. So, if I say a particular family is rigidly enmeshed, you will know they are extreme on both dimensions and that I am describing an entirely different family than one that is chaotically disengaged," Olson comments.

This model has been used as a therapy tool with runaway families, couples in counseling, and alcoholic families. The precision of definition it allows is helpful. For example, as Olson points out, "one of the common treatments for alcoholic families is to put them all through the same therapy program. If not all troubled families are alike, however, then they will not all respond equally well to the same treatment."

Olson and his colleagues did a study of four different alcoholic families to test their hypothesis that the families would all fall into

the extremes of the circumplex model. They did — but they fell into all four of the extremes.

"What this says," Olson states, "is that even though four families may exhibit the same symptoms, they could be four very different family types. So, if we are going to effectively treat family problems, we have to take the family system into account and not just deal with the symptoms."

Scientific definition and scientific measurement are all difficult when applied to the family. As Margaret Mead once said, "A family is tougher to work with than an individual and tougher than a whole culture. It is probably *the* toughest thing that you can prepare anybody to do therapy or research in." It is possible that the sort of dynamic model Olson has developed will be useful for both research and therapy in helping to define the healthy family, to treat families with problems, and he hopes, to work toward preventing problems in families.

New Directions in Cooking Microwave

GREG DOERNING
Department of Information
and Agricultural Journalism

IF THE LAST MEAL you cooked in your microwave oven didn't turn out very well and you wondered why, don't fret. University of Minnesota food scientists are working on the answers for you.

Research projects directed at understanding the effects of heat and of water loss on the structure of such foods as cakes, potatoes and pork during baking are being conducted by Eugenia Davis and Joan Gordon of the Department of Food Science and Nutrition. Results from these studies are being translated into mathematical models describing water loss, energy requirements, and the chemical reactions that occur during baking. Eventually this information will be applied to both microwave cooking and other food systems.

"Presently microwave ovens do not provide even coverage of heat radiation, nor is there any way to control temperature," Davis points out. "No two microwave ovens have equal microwave distribution, even similar models from the same company." Enough variations occur in microwave ovens that no cookbook can consistently predict the quality of a product after baking.

Instead of time recommendations for cooking food in microwave ovens, Davis and Gordon propose that measuring water loss in a food product could more accurately indicate when a food is ready to be served.

Using specially designed environmental and microwave ovens, the researchers are carefully regulating the baking process. The microwaves in the experimental oven provide uniform coverage and avoid the hot and cold spots which occur in home microwave ovens. "In a conventional home oven, only temperature is regulated and you may have a 30-degree variation from any given temperature," Davis said. "That is, an oven set at 320 degrees may actually have a temperature of anywhere from 290 to 350 de-



Eugenia Davis (left) and graduate student Ching Cheh Hung (right) evaluate the structure of heat and of water loss on the structure of foods using specially designed environmental and microwave ovens.

grees. Our environmental oven, on the other hand, has only a one-degree temperature variation.

"In addition, we can control the atmosphere inside the oven for dryness or wetness, do flavor control, and generally influence the chemical reactions occurring while baking a food product," she added. More important, the environmental oven allows the food researchers to monitor water loss during baking.

Heat not only precipitates water loss but also triggers chemical reactions in the cooking food. These changes affect the flavor and texture of the food. "Most researchers measure water loss only at the end of baking," explained Gordon. "But our work involves looking at water loss during the entire baking process."

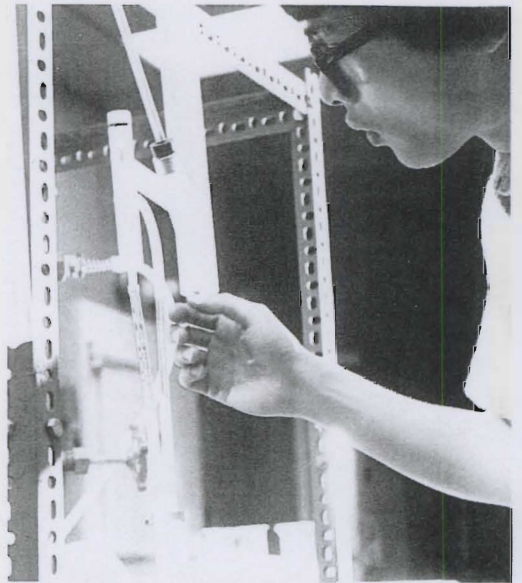
A Microscopic View

Along with the environmental and microwave ovens, Davis and Gordon are using electron microscopy to study the various foods. The electron microscope, with its powerful magnification, gives the scientists a three dimensional look at the cell structure of a food product. "It's as if you can go inside a cell," according to Davis, "and walk through it. You get a good

feeling for the topography of the cell." The two have been able to view the cell's nucleus, cell wall, and see the relationship between starch, protein, and air particles within the cell.

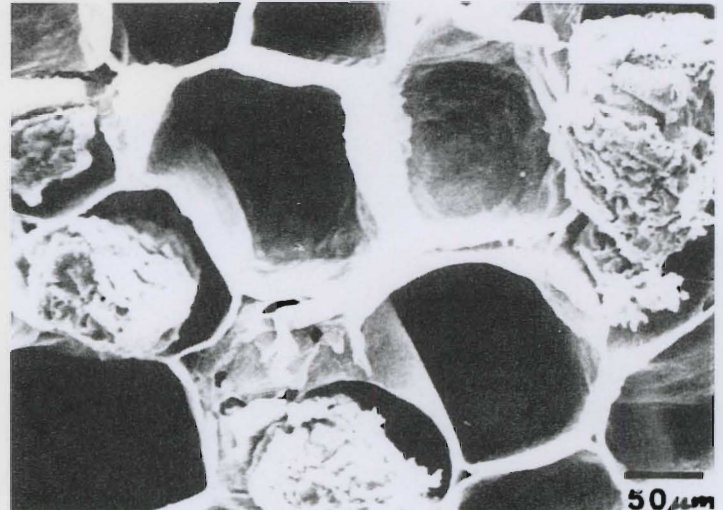
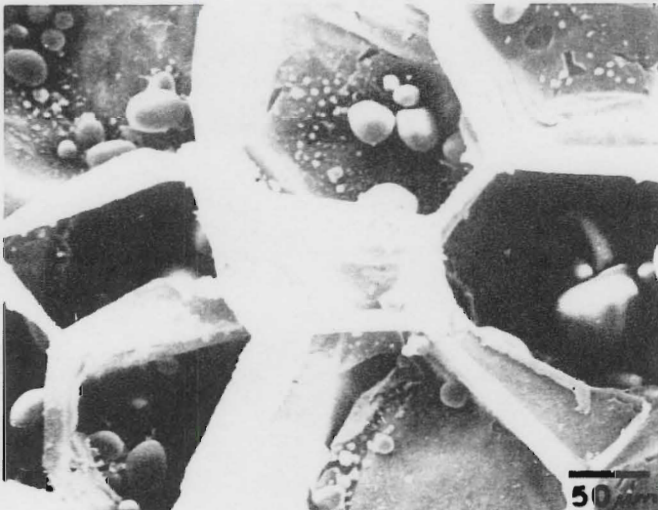
Using potato cells, the two researchers have noted the changes in starch particles after baking and have related these observations to the texture of the baked potato and its acceptability as a food product. Electron microscopy has also allowed the researchers to locate minerals in a specific part of a food cell. It is then possible to analyze the mineral content in a food and view how these minerals react when heated.

The benefits of these research tools applied to modern kitchen and eating habits is clear. "As more people get away from making foods from scratch, and more foods are processed, it becomes important to understand formulated food systems and their heat and water loss properties," Gordon explained. "Our present research can be applied to processed foods. We can use the environmental oven and the electron microscope to understand the chemistry of synthetic food additives and how they react together when heated conventionally or by microwave."



Ching Cheh Hung, whose research is through both the Departments of Chemical Engineering and Food Science and Nutrition, checks the pipes which control the airflow into the experimental microwave oven.

Potato tissue, raw (left) and cooked (right), under the electron microscope.



Grief —The Sorrow of the Soul

GAIL McCLURE

Department of Information
and Agricultural Journalism

... my manhood is cast
Down in a flood of remembrance,
I weep like a child for the past.

—Lawrence

WHEN SOMEONE DIES or goes away, do the people left behind experience grief in the same way? We don't know.

Amidst accelerating pressure to know more of the technical details which mark our social fabric, ironically, we still know the least about ourselves. Grief over death or separation is a fundamental human experience, yet it remains largely unexamined. Paul Rosenblatt and graduate students in the College of Home Economics are working to fill that void.

"You could say that every 75-year-old widow is an expert in grieving, but we have not done much to codify those experiences. We still remain uncertain which reactions are common and which are not — which we can consider

normal and healthy and which can sometimes lead to serious problems," says Rosenblatt.

For the past five years, Rosenblatt has used 19th-century American diaries to study the dynamics of grief over deaths and separations. "No one needs social science expertise to know that the ending of a close relationship is painful. However, it may help a person to know that grief bubbles up recurrently and having such an experience does not differentiate that person from other bereaved people. It may also help people to know it is not particularly unusual to experience a sense of the presence of someone who is gone.

"I also think this research has some therapeutic implications. One of my graduate students, Pat

Johnson, and I contend that there's a qualitative difference between incomplete grieving and emergent grieving. By incomplete grief I refer to the feelings of unfinished business which usually have continuity with acute grief following a loss. Emergent grief is not continuous but occurs now and then over the years, often as a result of some newly emergent reminder, such as the birth of a grandchild. Emergent grief is probably universal for bereaved persons in this culture and the most frequently occurring type of grief experience after acute grief has passed," says Rosenblatt. Evidence in the diaries supports his distinction.

Rosenblatt finds the diaries good resource material, because they give a relatively fine texture to the record of loss. This fine texture "provides more data points," allowing him to see more clearly day-to-day changes, changes over time, and the effects of specific human events. He also believes the diaries are more accurate than most alternatives — accurate in the sense of dates, people, places, and also in the sense that they provide a less-censored report of reactions.

An initial reaction to the diary material might be that it is not valid because people are different now. Nineteenth-century America was a different culture. But Rosenblatt disagrees. "It seems to me that the basic character of close relationships does not vary in the species. Grief over relationship ending occurs in all people. There are differences between then and now, to be sure, in terms of the frequency of deaths or in how

Nineteenth century diaries reveal the dynamics of grief and separation.



the terminally ill are cared for, but the basic experiences of bereaved people seem much the same," says Rosenblatt.

The evidence from the diaries indicates that grief comes and goes recurrently. Times of remembering can be followed by times of no mention. After the initial period of grief, most expressions of grief seem to be caused by a particular stimulus, like a birthday, an anniversary, or a familiar place or setting. "This suggests that grief is, to some extent, out of one's control. Events and other people can produce it. Paradoxically, it also suggests that one can control grief, in part, by avoiding certain places and people and preoccupying oneself at certain times," says Rosenblatt.

Many diarists were concerned with emotional control of their grief. They felt they had to control grief in order to carry on (raise the children or keep the business going) and to maintain or establish a comfortable relationship with God. Evidently, many diarists feared excessive grief would be seen (by themselves or others or God) as a lack of faith.

Rosenblatt identified four major approaches diarists used to control their emotions over death or separation.

1. They acted inconsistently with their feelings.

"We . . . learned to press back the pain in our hearts behind a smooth exterior (and) . . . wave a cheery farewell, though not within our hearts." (Diary of Linka Keyser, entry August 6, 1850. Published in 1952 by Augsburg Publishing Co., Minneapolis.)

2. They instructed themselves to behave in a controlled fashion. "Alone! . . . My wife dead, my child an alien to my home! God give me strength to bear and submit." (Diary of Martin W. Phillips, entry June 2, 1862. Publications of the Mississippi Historical Society, 1909.)



3. They avoided reminders of loss. ". . . I have meandered here & there, have engaged in exciting business away from home and all those thousands of reminders there of my irreparable loss, hoping that time would assuage in some small degree the sorrow of soul, but it is all of no avail tonight. The hurt bleeds & the tears flow." (Dustin G. Cheever, Diary, December 21, 1873. Whitewater MSS. O., The State Historical Society of Wisconsin).
4. They sought compensations or some way to determine that what had happened was not so bad after all. "Oh Lord God Almighty give me some tangible evidence of the immortality of my beloved ones removed from my sight. I

need it, oh Lord." (Diary of Marcus Gunn, January 27, 1853. Unpublished transcript. Courtesy of the Public Archives of Canada.)

Two days after writing this, Gunn contacted a spirit medium in a continued effort to seek the reassurances he needed.

Diarist attempts to control grief, whether successful or not in particular situations, brought no guarantees that the grief would not surface again. "I think it safe to say that a bereaved person can never be sure that the work of dealing with a loss has ended. That does not mean there is necessarily anything pathological in the process," says Rosenblatt.

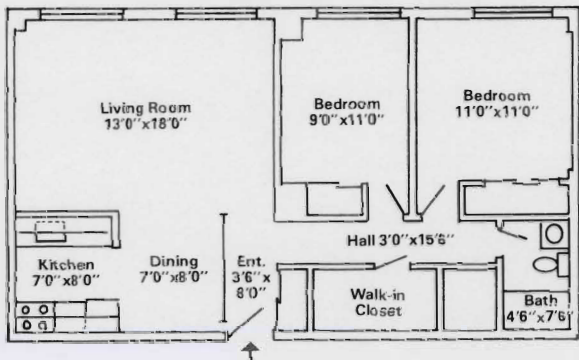
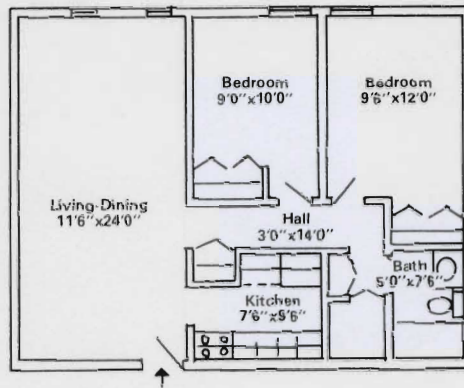
"We social scientists need to admit that our knowledge base is

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A Place of Their Own

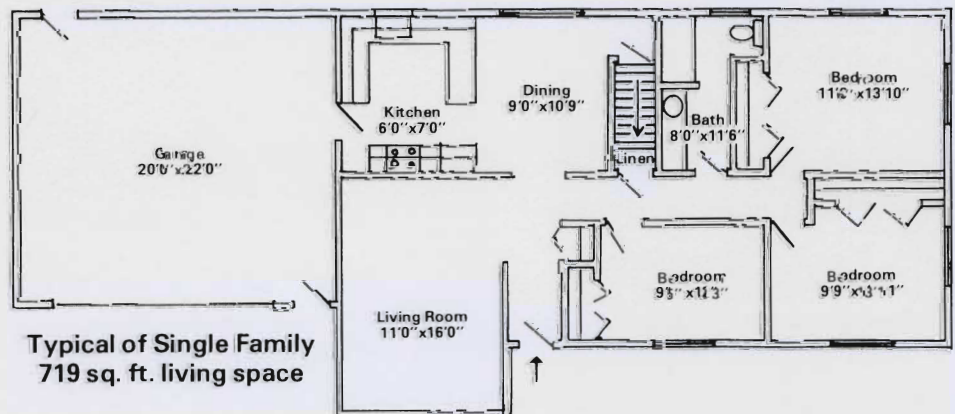
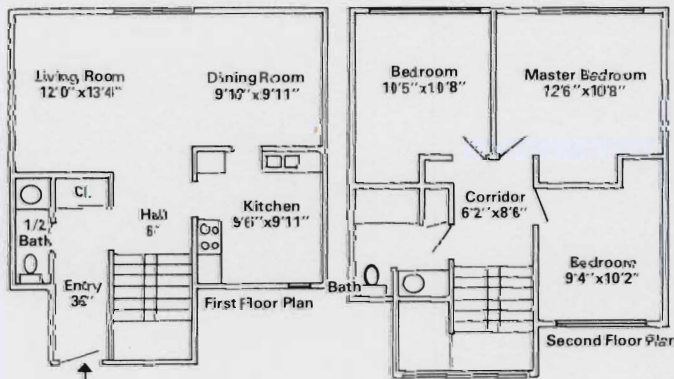
DIEDRE NAGY
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**Walk-up
Apartment
640 sq. ft.
living space**



**Highrise
Apartment
670 sq. ft.
living space**

**Town House
774 sq. ft.
living space
1st and
2nd floors**



**Typical of Single Family
719 sq. ft. living space**

LABEL IT THE Great American Dream — the cozy bungalow with a picket fence and a swing set in the back yard for Junior.

Unfortunately, says Evelyn Franklin, home economics design instructor at the University of Minnesota, it's quickly becoming an impossible dream for many low and moderate income families.

Because housing prices are rising faster than many families can keep up with, Franklin was interested in seeing how families use their housing space and how satisfied they were with their single family homes, as well as such alternatives as apartments, townhouses, and mobile homes.

"By looking at how and where parents and children spent their time at home and how pleased they were with features of their homes, I hoped to gain some insights that would be useful to architects and developers planning housing for young families. I wanted to identify common needs of families in this stage of the life cycle," Franklin said.

With those goals in mind, she began a study of 37 moderate income families in the Twin Cities area. All the families included two parents and at least two preschool children. They were divided about evenly among five housing types: single family homes, mobile homes, townhouses, highrise apartments, and walk-up apartments in three story structures. Although the housing types were diverse, there were some common

features, according to Franklin. All met the Housing and Urban Development (HUD) minimum property standards and all were built in the late 1960s or early 1970s. The units ranged in size from about 650 square feet of living space for the two apartment types to around 800 square feet, excluding basement, for the townhouses and single family homes. The mobile homes had about 730 square feet of living space.

Franklin spent at least three hours observing family activities and traffic patterns in each home. In addition, she asked participants to recall their activities and movements at other times of the day. She also questioned them about the good and bad features of their homes.

Home Ownership Still a Goal

One result was startling. Despite the similarities between the dwellings in square footage, age and conveniences, the apartment and townhouse residents still termed their housing as temporary. Most pointed to a single family home as their eventual goal.

Mobile home owners didn't see their locations in exactly the same way. However, the good points they listed about their homes were similar to those the single family home owners listed—privacy, easy access to outdoors, yard space, and light and ventilation from windows on all sides of the home.

"It seems clear," Franklin said, "that the more architects and developers can do to design multi-family structures that have the sought-after features of the single

family home, the happier the families living there are likely to be."

She found, for example, that townhouse owners often mentioned enjoying their patios and the ease of going in and out. Access to the outdoors also took some strain off indoor living areas. Highrise residents in the study spent the most time in their living rooms. Walk-up apartment dwellers were next highest on that score. Franklin explained, "In most cases, pre-school children in apartments couldn't get outdoors by themselves, so even in the spring, summer, and fall, when the data were collected, they spent more time indoors than did children in other housing types."

Except for the single family homes in the study, all the living units within each type had the same floor plan. This helped Franklin gauge strengths and weaknesses of basic designs. She found, for example, that dead end, galley-style kitchens often found in apartments drew criticism from many apartment residents. Time spent preparing food and other food-related activities was second only to child care time for most homemakers, and they often described their kitchens as too confining and limited in storage and counter space.

They also objected to kitchen arrangements that cut off a view of the living area. "In small, one-person kitchens, children generally played in an adjoining room and this made for considerable walking back and forth between the rooms," Franklin said. "There was less of this in the townhouses and the single family homes, which

had larger kitchens with eating areas included, or in the mobile homes, where the homemaker could see the living room from the kitchen.

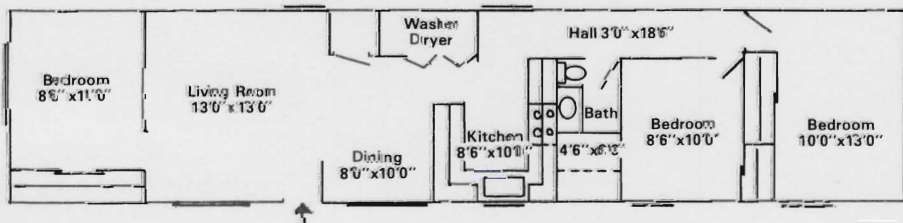
Storage and Private Space: Never Enough

Small bedrooms, particularly when two children shared a room, were a common complaint. Franklin suggests that architects should plan more built-in storage space. Children's tricycles, wagons, and sleds posed particular storage problems for apartment residents. Basements, garages, and outdoor storage compartments for families in townhouses, mobile homes, and single family homes took the edge off their storage complaints, although many of them also yearned for more, Franklin said.

Private space for adults was at a premium in most of the residences. "Even bedrooms and bathrooms didn't seem to be places where the adults, particularly the mother-homemakers, could close the door and be alone," Franklin commented. "There was less of this concern in the townhouses and single family homes, perhaps because there was more overall space and less need for all family members to use every available inch. Several women commented that their husbands considered the master bedroom as their own private space, but the women themselves seldom did."

Bathrooms were small in all the housing options, but even an additional foot or two of room dimension added to family contentment with the space, Franklin said. For example, bathrooms that included some counter space alongside the sink or a small linen closet were judged more adequate than those where fixtures were jammed together.

"The problems of crowded bedrooms and tiny bathrooms are just examples of how HUD's minimum room sizes aren't actually spacious enough for most young families," Franklin said. "Even small adjustments and provisions for storage and comfort helped increase residents' satisfaction."



Mobile Home
734 sq. ft. living space



A Vitamin in Search of a Disease

MARY KAY O'HEARN
Department of Information
and Agricultural Journalism

VITAMIN E. It is purported to be good for the heart, skin conditions, acne, aging, peptic ulcer, and habitual abortion. Some manufacturers add it to deodorants and after shave lotions.

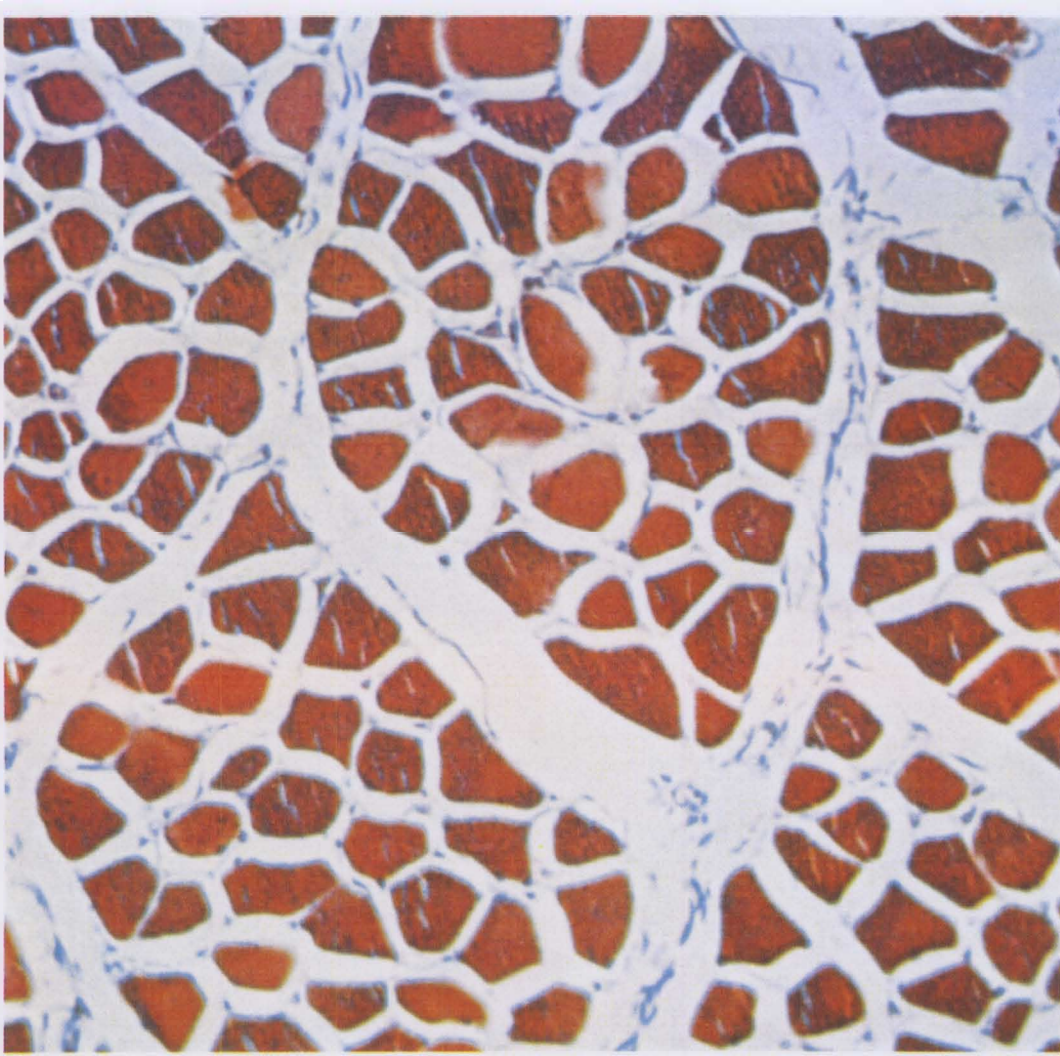
Despite all the bouquets tossed at it, vitamin E appears to be neither particularly beneficial nor harmful to humans. Both medical and animal scientists have more questions about vitamin E than they have yet found answers.

Vincent Hegarty, professor of food science and nutrition at the University of Minnesota, remembers hearing the vitamin referred to as "a vitamin in search of a disease." According to Hegarty, "Vitamin E deficiency is rarely found in the human adult population." Some years ago it looked as if vitamin E studies going on worldwide might offer a clue to hereditary muscular dystrophy. However, this has not yet developed and the vitamin remains complex and little understood.

For the past five years Hegarty, along with C. E. Allen, of the same department, has supervised a vitamin E deficiency study conducted by graduate student Alvin Chan. Supported by Experiment Station funds, the project has looked more closely at the vitamin E/muscle link. Chan induced nutritional muscular dystrophy (NMD) in a group of male weanling New Zealand rabbits by withholding vitamin E from their diets. The importance of the vitamin to the animal muscle came through quite clearly.

Rabbits on the diet without vitamin E died in 34 days. "Rabbits lost weight, their muscles were so wasted they could not get to their feet, and they lost their righting reflex—the ability to turn over when placed on their backs," Hegarty describes.

The vitamin E-deficient groups had a rather sharp loss in body weight about the 22nd day on the diet. This sudden weight loss coincided with a sharp decrease in eat-



Vitamin E had a dramatic impact on rabbit muscle in this study. E-deficient muscle (far left) recovered completely after rabbits were fed doses of vitamin E (left).

ing. Rabbits on E-deficient diets for 28 days were given oral doses of 50 mg vitamin E on the 28th day. Their eating returned to normal on the 30th day and they gained weight rapidly, catching up to the control rabbit group (those not deprived of vitamin E). In addition, dramatic differences in those fed and not fed vitamin E showed up when the muscle was examined under an electron microscope.

All of this suggests that NMD can be induced in rabbits through diet and it can be cured. However, thus far none of these results can be translated to treatment of hereditary muscular dystrophy in humans. "Rabbits have the same lesions seen in muscular dystrophy and most other symptoms are the same, yet inherited and induced muscular dystrophy are two completely different diseases," Hegarty notes.

As a result of these rabbit studies, Chan has become more aware

of another factor which may some day help unravel the mysteries of vitamin E—"prostaglandins." These are potent compounds that affect many parts of the body at minute levels and sometimes can produce opposite effects in the same cellular system. So far, prostaglandins have been shown to be involved in such vital functions as smooth muscle contractions, reproduction, gastric secretion, the central nervous system, the cardiovascular system, and kidney functions.

Hegarty points out that aspirin, a prostaglandin inhibitor, has been known to alleviate certain vitamin E deficiencies in rats. If further research could translate this to humans, it might mean that someone who is allergic to certain foods, such as shellfish or eggs, *might* be able to tolerate them if an aspirin-like substance were taken beforehand. He feels that this is just one of the possibilities for practical application when

more about vitamin E is known. Chan is currently pursuing the prostaglandin angle at the University of Manitoba.

Vitamin E's effect on muscle interests animal scientists too. "The more muscle, the more meat on farm animals," Hegarty says. "Furthermore, very low levels of selenium can replace the vitamin E needs of certain farm animals. The full implications of the interrelationship between this trace element and the fat-soluble vitamin E has not been worked out for humans, though."

In this vitamin-conscious world, should humans be dosing themselves with "megadoses" of vitamin E? When the daily requirement is said to be 15 international units for men and 12 for women, should people be taking hundreds? Some do.

As in all research, many questions remain.

Where There's Smoke...

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Graduate student Marjorie Norton adjusts garment before burning it on the instrumented mannequin. Crosses on mannequin indicate location of thermocouples.

IF YOU WERE to be caught suddenly in a kitchen fire, do you know what kind of clothing you would be safest in?

Chances are, you would suffer less personal injury if you were wearing blue jeans and a wool shirt than if you had on light weight slacks and a gauze shirt. Why? Because the heavier garments generally would be harder to ignite and would burn more slowly than light ones. They would be much less of a hazard to you.

The relationship of garment weight, fiber content, and fit to safety is just one of the concepts that Robert F. Johnson of the Textiles and Clothing department is working with as part of a study on flammability of clothing. His goal is to come up with some kind of flammability hazard index which consumers can use to judge the relative safety of the garments they buy. However, he feels the project will also help identify some of the strengths and weaknesses of current flammability testing methods used in university research and by industry.

Johnson and his assistants, Sally A. Hasselbrack, Sara J. Kadolph, and Marjorie T. Norton have been focusing on women's garments in their research. This category was chosen because about 40 percent of all home accidents are clothing fires that happen to women working in the kitchen in the morning or late at night. Furthermore, the government standard for testing the flam-

mability of women's clothing at this time is not a valid predictor of flammability hazard.

To date, women's garment testing in the apparel industry has involved measuring flammability in terms of the amount of time it takes for a small piece of material to burn. These "strip test" methods cannot and do not take into consideration the design details of garments, such as seams and fitted waistlines which may serve as paths for or block a fire, respectively. Another weakness of industrial test methods is that it is difficult to translate the results of burning the 30-square-inch test strip to actual garments. A slightly gathered, below-the-knee skirt, fashionable today, contains some 1500 square inches of fabric — quite a difference from the amount of fabric tested.

The first step for the researchers, then, was to devise a realistic method of testing flammability. They decided to burn complete outfits on a body form (mannequin) so they could gauge the degree of burning at positions of the body that tend to trap heat (crotch, abdomen, armpits, and under the chin and shoulder blades), as well as take more general kinds of measurements. Kenneth A. Jordan, professor of agricultural engineering at the University of Minnesota, collaborated with them in designing and constructing a thermally instrumented mannequin that enabled them to do computations for 23 positions on the body.

Science Notes

CLOTHING: A SYMBOL IN OCCUPATIONAL LIFE

One very important aspect of this project has been determining the validity of the testing done on the mannequin. Though between 6 and 8 similar mannequins are being used throughout the country, nowhere have extensive validity studies been done. Hasselbrack, who is currently a research scientist with the Boeing Aircraft Corporation, concentrated on this portion of the research, comparing mannequin tests with information from actual fires.

By working with hospital records from 10 burn cases, she was able to replicate such things as causes of the fires, actions taken by the victims, and the style and fabric of the actual garments burned. Matching test results with medical records enabled her to conclude that the extent and severity of burn injury in clothing fires could be accurately predicted with the mannequin when the rate of burning is so fast that the clothing cannot be removed or other defensive actions taken by the victim or bystanders.

A second phase of the research has been comparing strip test results with those from whole garment tests. Kadolph, who is presently a home economics instructor at the University of Iowa, worked with 63 different adult female outfits. She burned samples cut from the back or sleeve of each garment according to standard industrial methods as well as whole garments on the mannequin. With resulting data, Kadolph and Johnson hope to get closer to being

able to predict the flammability hazard of a garment.

As an end product of all their work, the researchers would like to be able to devise some kind of system for rating the flammability of various types of garments. They envision labeling ready-made clothing with some kind of hang tag in much the same way it is already labeled with cleaning instructions. However, they agree that this system may be a long way off.

"It is not just the fiber content, fit, and fabric construction, but rather a combination of all of these things that seems to determine the relative hazard of a particular garment," says Kadolph. "And, the more we work with this problem, the more dimensions we seem to uncover. I'm not sure that we will ever be able to make definite statements about particular items of clothing."

The researchers do feel, though, that some general principles seem to be emerging that will be very helpful to consumers as they shop. For example, they know that the tighter the fit, and the heavier the fabric, the safer a piece of clothing will be. The degree of safety will increase if the fabric is fire or flame retardant.

It is possible that some day every item of apparel that is sold in this country will be labeled with a flammability rating. In the meantime, UM researchers are trying to help consumers become a little wiser about flammability and make their clothing a little bit safer.

Researchers at the University of Minnesota and Michigan State University are working together in investigating the relationship of clothing to the quality of life. Involved from the Department of Textiles and Clothing in the College of Home Economics are Joanne B. Eicher, professor and head, Gloria Williams, assistant professor, and Judy Gagnon, research assistant. The title of their project is "Clothing Use and Quality of Life in Rural and Urban Communities."

Clothing is an individual's "second skin." As such, it fulfills physical, psychological, social, cultural needs. In this study, the researchers are looking at the importance of clothing in people's satisfaction with every day life. Data have been collected for various age, sex, race, and place of residence categories.

In one portion of the Michigan study, clothing was examined in comparison with other life domains, including housing, jobs, and family life. The scientists have looked at these domains with respect to independence or freedom, standard of living, safety, and acceptance and inclusion by others. Their findings have helped to support the idea that clothing does make a difference in how people feel about the quality of their lives.

The Minnesota work is placing special emphasis on assessing clothing as a symbol in occupational life and especially how it affects the way people are appraised in different job situations. For example, Eicher, Williams, and Gagnon are looking at the role of clothing in situations where a person might be seeking professional assistance in job mobility and in interactions with co-workers.

As part of their data gathering, the three have asked people to do some role playing and evaluate themselves and their clothing in particular situations. In other ques-

tions, respondents have been asked to appraise certain characters in interpersonal situations. It is expected that differences in responses will occur according to sex, race, occupation, education, and place of residence. Because clothing and appearance are basic elements in forming first impressions, the researchers expect that the degree of complexity of people's appraisals will show a strong relationship to these kinds of socio-economic characteristics.

— Lee Nelson

CYDR EXPLORES YOUTH PROBLEMS

The continuing research of the Center for Youth Development and Research (CYDR) has uncovered new information on such varied topics as youth attitudes to the draft and newspaper coverage of delinquency. Among the findings: **Minnesota Youth Poll** — The Minnesota Youth Polls provide an opportunity for young Minnesotans to state their opinions and experiences on significant issues of concern to them such as health, youth rights, drug and alcohol abuse, among others. These polls are conducted in approximately 25 high schools and youth organizations throughout the state and provide a communication link between Minnesota teenagers and those adults who provide services and

make decisions which affect their lives. Teenagers themselves are involved in collecting and analyzing the data, and this has helped to keep research costs down to approximately \$4,000 per poll as well as insure the polls are appropriate to the needs and interests of youth.

In the latest poll, researchers sampled youth opinion on non-military and military youth service programs. Opinions from about 500 young people indicated a generally positive reaction to a one- or two-year government or community service commitment by youth.

Rural youths were the most strongly in favor of a community service commitment similar to that now offered under the VISTA program or the Peace Corps. They were followed by urban and suburban youths who looked less favorably upon the proposal. Least interested in such a program were inner city, alienated youths.

Newspapers and Delinquency

— Content analyses of more than 2,000 editions of Twin Cities and some outstate papers showed that coverage of youth delinquency was often biased toward reports of active, violent crimes. Little attention was given to the more common types of youth offenses, such as truancy and running away from home. News stories and editorials all tended to emphasize serious,

violent, and multiple incidents of delinquency despite the relative infrequency of such acts, according to CYDR researchers.

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not great," he continues. "Our attempts to help people, while well intentioned for the most part, are not always successful. There is a lot we don't know. This is a very inexact science. However, that does not mean I don't think we can get at 'truth.' If a researcher is intellectually honest, has the capacity to admit to doubts and to submit ideas to rigorous criticism, then we can get at some real important truths."

Centuries have passed since the philosopher Plato proclaimed the unexamined life not worth living. Nonetheless, we remain blissfully, perhaps willfully, ignorant of many of our common emotional experiences.

When David wept for Absalom was he coming to grips with his sorrow in the same way as the Minnesota mother mourning her child's death from cancer? We don't know.

Rosenblatt and other social science researchers will help answer such questions, and in the process, they'll help us to understand ourselves and our feelings better. That is one of the incalculable benefits from research.

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**FINANCIAL STATEMENT
MINNESOTA AGRICULTURAL
EXPERIMENT STATION
Research Fund Expenditures
Fiscal Year 1978
Expenditures by Source**

	Percent	Amount
Federal Funds	13.9	\$ 3,169,366
State		
Appropriations	60.4	13,812,339
Gifts and		
Grants	17.6	4,027,142
Fees, Sales,		
Miscellaneous	8.1	1,859,776
Total	100.0	\$22,868,623

**Expenditures by Object
Classification**

Personal		
Services	72.2	\$16,519,421
Travel	2.2	494,437
Equipment,		
Lands,		
Structures	5.6	1,272,818
Supplies and		
Expense	20.0	4,581,947
Total	100.0	\$22,868,623

Expenditures by Location

University of		
Minnesota —		
St. Paul	85.3	\$19,512,528
Branch Stations		
— within		
Minnesota	14.7	3,356,095
Total	100.0	\$22,868,623