

AN INSTRUMENT TO INVESTIGATE CONSUMER DEMAND, USE
AND CARE OF FLAME RESISTANT TREATED TEXTILE ITEMS

by

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CHAPTER I

INTRODUCTION

Fires resulting in injury and death of thousands of humans in dwellings and institutions have received growing concern in the past few years. According to the National Fire Protection Association (16), 12,000 people died as a result of burns and smoke inhalation in 1970; 75,000 were hospitalized. Fire is one of the nation's major causes of accidental death, exceeded only by falls and motor vehicle accidents (1, 16, 50). The two groups of people most often victims of such accidents are children under five years of age and elderly citizens (2, 4, 30). The most frequent cause of ignition among young children is brushing against a flame; among elderly people, smoking is often a direct cause of fire (30). A study by the National Burn Information Exchange in Ann Arbor, Michigan (30) indicated that members of low-income families were two to three times more likely than other population segments to be severely injured in fires.

The ignition of clothing causes about 3,000 deaths each year, and injury to an additional 150,000 persons yearly (49). The National Safety Council (38) has listed

the three major sources of ignition of clothing fires as cooking, heating, and smoking. Clothing burn victims require more hospital days, more plastic surgery, more physical therapy and rehabilitation than other burn patients (16, 44, 50). The home is the most frequent place of occurrence for clothing fires (44, 50).

The Department of Commerce has begun to regulate the production and sale of some textile items in an attempt to minimize further injury and death. A standard issued in July, 1971, by the Federal Trade Commission stated that as of July 30, 1972, all children's sleepwear, size 6X and smaller, must meet criteria outlined by the Department of Commerce, or be labeled "FLAMMABLE (DOES NOT MEET U.S. DEPARTMENT OF COMMERCE DOC FF 3-71) SHOULD NOT BE WORN NEAR SOURCE OF FLAME." By July 30, 1973, sleepwear in these sizes, which does not meet the standards cannot be sold legally in retail markets in the United States (46).

In the government's effort to protect people from flammable fabrics, the consumers' own feelings may have been overlooked. At least one spokesman voiced the opinion that the publicity about flammability has come from Washington and not from the public (10). None of the available literature indicated that any effort has been made to determine whether or not the consumer has any interest in flame resistant fabrics, and if so, at what cost in money,

durability, and general aesthetics. Some sources state that the consuming public has clearly indicated it is not willing to pay for flammability protection (4, 29).

Perhaps if consumers were educated to the importance of flame resistant textiles, they might be more willing to accept higher costs, lower aesthetics, or poorer durability, all of which may be characteristics of such products (15, 16, 22, 41). One of the four major recommendations emanating from an international conference on textile flammability and product safety was that more effort should be devoted to educating the population about the dangers of fabric flammability (41). In order that consumers eventually be educated to the dangers of fires and the benefits of flame resistant textile items, it may be desirable to know the factors which influence their awareness of the problem and their willingness to help minimize the consequences.

In an attempt to ascertain such information and to investigate the marketing and performance of flame resistant textile items, the Northeast Regional Textiles and Clothing Project (NE-79) was developed. Its title is "Consumer, Market, and Laboratory Studies of Flame Resistant Textile Items." Seven universities are participating in the regional project: Cornell University, The Pennsylvania State University, University of Delaware, University

of Maine, University of Rhode Island, University of Vermont, and Virginia Polytechnic Institute and State University. Under Objective I of the regional project (NE-79) a field study will be conducted to determine influences on consumer demand for flame resistant textile items, and practices relative to their use and care.

An original instrument for collecting data for the "Consumer Study of Flame Resistant Textile Items," (Objective I, NE-79) was to be developed by personnel from three of the participating institutions. In view of the size and geographic location of the sample, a mailed questionnaire was considered the most practical device for acquiring data. The Pennsylvania State University assumed responsibility for two specific operational objectives, which were to investigate:

1. Types of garments used for children's sleepwear.
2. Source of children's sleepwear.

University of Rhode Island explored:

1. Consumer knowledge of terminology concerning fabric flammability.
2. Consumer knowledge of federal legislation concerning flammability of selected textile items.
3. Importance of flame resistance of selected textile items to the consumer.

4. Use of selected flame resistant textile items.
5. Willingness to pay more money for selected flame resistant items.
6. Laundering practices used for children's sleepwear.

Virginia Polytechnic Institute and State University, and thus, this researcher, concentrated on these areas:

1. Consumer's experiences with fire involving textile items.
2. Potential fire hazards existing in consumer's home.
3. Types of store in which consumer shops for children's clothing and selected household items.
4. Demographic and background information about respondents.

It was anticipated that the present exploratory study would contribute to the regional project. Therefore, the major purposes of this study were the following:

1. Cooperate in development of an instrument to be used in the "Consumer Study of Flame Resistant Textile Items," (NE-79), concentrating on three of the eleven operational objectives, as well as demographic and background information.
 - a. Determine consumer's experiences with fire involving textile items.

- b. Investigate potential fire hazards existing in the home.
 - c. Determine types of stores in which consumer shops for children's clothing and selected household items.
2. Test reliability of the total instrument through the test-retest method.
 3. Serve as a pilot study for the "Consumer Study of Flame Resistant Textile Items," (Objective I, NE-79), in determining factors influencing consumer demand for flame resistant textile items, and practices relative to their use and care.

CHAPTER II

REVIEW OF LITERATURE

The literature revealed numerous reactions to the regulation of flammability of textile products. Industry representatives, legislators, educators, and consumers have expressed varying opinions about the impact and importance of such regulation.

Flammability Legislation

Widespread publicity about flammable fabrics and the first attempts to solve the problem of deaths and injuries caused by fire came after World War II. In 1945, a number of small boys were burned to death when their long-napped rayon cowboy chaps ignited (4, 12, 17, 51). In that year the State of California passed legislation prohibiting the use of fabric "more flammable than cotton in its natural state (31)."

A series of fatal incidents in the 1950's with "torch sweaters" that burst into flame at the presence of a match gave further impetus to public concern (4, 12, 42) and promulgated the current Flammable Fabrics Act, passed by the Federal government June 30, 1953 (13). The purpose of the Flammable Fabrics Act was to regulate the marketing

of wearing apparel or fabric "so highly flammable as to be dangerous when worn by individuals (13)."

The Act was limited, but it did reduce the volume of fabrics and garments generally considered dangerously flammable (42). There was little reason to believe that the Act significantly reduced the general level of deaths and injuries, since the items eliminated constituted a minor part of the total U. S. apparel consumption. Most apparel burn accidents involve ordinary fabrics which present moderate hazards that are usually recognized by the average consumer (42, 49).

A movement to protect the consumer with legislation during President Johnson's administration included an amendment to the Flammable Fabrics Act in December, 1967 (13). It directed the Secretary of Commerce and the Secretary of Health, Education and Welfare to study and investigate deaths, injuries and economic loss resulting from accidental burns. The Secretary of Commerce was enabled, on the basis of such research, to adjust flammability testing procedures and standards without legislation, to protect the public against "unreasonable risk of death or injury or significant damage." It was realized that probably not all burn injuries involving fabric fires could be eliminated; and one of the biggest problems was to clearly define what constituted an "unreasonable risk of death or

injury . . . (4)." The National Bureau of Standards, which was given the primary responsibility for standards development under the Flammable Fabrics Act, has concentrated on the areas of fabric flammability considered most important (42).

Carpet standards

Standards, effective April, 1971, were issued for carpets and rugs (47). The initial regulation required flame testing of all carpets and rugs with a surface area greater than twenty-four square feet or any one dimension greater than six feet. The original standard included testing of only the carpet itself, but investigations of a highly publicized nursing home fire showed that the attached carpet backing material propagated flame and caused large quantities of toxic smoke and vapors. The flammability of the backing material could have been detected by using the same testing procedure required for the carpet itself. Thus, a modification of the standard has been voluntarily adopted by the carpet industry (31, 42).

A standard for small rugs became effective December, 1971. The manufacturer was required to comply with the flame test outlined in the ruling, or label his product with the information that it did not pass the test (50).

Sleepwear standards

Determining flammability standards for apparel have been considered the most controversial of all such regulations because these more directly affect the consumer (16). The first proposed standards in this area were issued in November, 1970 (46). In July, 1971, a more severe flammability test was adopted because fabrics involved in most burn cases which had been investigated would have passed the original flammability criteria (1, 39). This later ruling issued by the Department of Commerce required that fabrics and garments must not ignite and burn when tested in a vertical position by a brief exposure to flame (46). As of July 30, 1972, all children's sleepwear, size 6X and smaller, were required to meet these standards or be labeled, "FLAMMABLE . . ." According to this ruling, sleepwear in these sizes failing to pass such standards cannot be sold in United States markets after July 30, 1973.

The proposed standards for children's sleepwear were supported by data (31) from 580 cases of clothing fires investigated by the Department of Health, Education and Welfare, and analyzed by the Department of Commerce. That study indicated that children five years of age and younger, were injured at particularly high frequencies by burning sleepwear. Injury occurred approximately one and one-

half to four times as often as would be expected on the basis of their percentage of total population in the nation.

Other flammability standards

The Department of Commerce recently has investigated the need for regulation of children's dresses and underwear (40). In November, 1971, an ad hoc committee of manufacturers was formed to deal with problems of manufacturing and marketing flame retardant girls' dresses (11). These apparel producers expected flammability standards for children's dresses to be established within five to six months.

At a meeting of the Information Council on Fabric Flammability (23), it was reported that Lewis Brancomb, Director of the National Bureau of Standards, had stated that more information was needed to determine the need for an underwear flammability standard. Research and accident information did not clearly indicate whether underwear was protective or damaging to the skin during clothing fires.

There has been some indication that control of flammability of apparel for the elderly may be attempted (42). The age group 55 years and older has shared the high risk category with the very young (4, 29, 30, 50). Formulation of flammability criteria for this group may be extremely

difficult since it cannot be done on the basis of apparel size (42). Many garments may be equally appropriate for both young and older adults.

In June, 1970, the Department of Commerce published findings of the possible need for flammability standards applicable to mattresses and blankets (31). Data from the Department of Health, Education and Welfare (49) and the National Fire Prevention Association (31) indicated a high incidence of fires and injuries resulting from bedding fires.

In addition to these activities at the federal level, state fire marshals and city governments have established regulations and ordinances to control the flammability of fabrics used in places of public assembly (42). Retailers and wholesalers may prefer extensive federal legislation in lieu of a conglomeration of varying state regulations that would seriously complicate the interstate marketing of goods.

Reaction to Legislation

Industry

The children's sleepwear standard was criticized by representatives of both manmade fiber and cotton industries at a meeting of the Information Council on Fabric Flammability (31). The major complaint was the proposed test.

Spokesmen (5, 23) voiced objection to the requirements of 50 washings and dryings, and of testing the most flammable portion of the garment.

Fortess (23) of Celanese pointed out that the apparel manufacturer was expected to be responsible for meeting the standard. He pointed out that one area of confusion would be to determine what was the "most flammable part of the finished item" on which the test was based. He also emphasized that many small manufacturers had no familiarity with testing of any type, and that even an experienced laboratory would be pressed for time, facilities, and money. Complexity and expense of testing might cause many small manufacturers to go out of business (4).

At a flammability symposium sponsored by the American Apparel Manufacturers Association, it was indicated that since the reproducibility and reliability of the test method were unpredictable, it was highly possible that sleepwear would no longer be produced in the United States unless that standard and its enforcement were changed (33). The Association encouraged industry to concentrate on labeling children's sleepwear size 0 to 6X "flammable" rather than attempt to meet the federal ruling. Some apparel producers (3, 35) have anticipated negative consumer reaction to such disclaimer labels. The National Cotton Council recommended that the labeling read, "Warning: This

garment, like most textiles, is flammable. Should not be worn near source of fire (3)."

Many representatives of the textile industry have insisted that compliance with the standard in its present form is impossible. Buck (17), technical consultant to the National Cotton Council, indicated that 99 per cent of all textile items would fail the proposed sleepwear flammability standard. He said that safety could be advanced more quickly if Congress emphasized developing new technology rather than penalizing those not complying with the standards.

Stans (46), Department of Commerce Secretary, stated that it would be technologically practicable for the majority of companies to meet the regulation within 24 months, even though some industry sources insisted that they needed 31 to 36 months to comply with the ruling. He also indicated that he believed some companies would be ready to comply within 12 months.

During Congressional hearings about flammable fabrics, a Sears, Roebuck and Company witness objected to the fact that his company had often been used as an example that flame resistant sleepwear could successfully be made to pass the standard (20). He stated that the fabric in those sleepwear items had been shown to fail 10 times out of 100 when tested for compliance.

Ira Quint, group national manager for children's and youth apparel, said Sears, Roebuck and Company and other retailers might discontinue the sale of this category of merchandise unless the standard was revised (34). His justification was that risks of penalty would be far greater than possible gains. The stand taken by Sears, Roebuck and Company was supported by other manufacturers, but not all of them anticipated total elimination of the line of merchandise (35). Many voiced hope for a modified standard to which compliance would be more feasible. American Apparel Manufacturers Association asked that Congress amend the sleepwear flammability standard to be less stringent in exchange for an earlier compliance date (26).

One major objection to the sleepwear regulation was the increase in costs that would be imposed. Money spent by the industry on the development of fire resistant fabrics was estimated at 25 to 60 million dollars a year (42). According to Buck (5) each item or garment would cost 25 to 50 per cent more. Not only would chemical finishing and garment and fabric testing add to costs, but expense would be compounded by the need for proper care labeling (5, 6, 19, 23). To develop flame retardant fabrics that would withstand all conceivable types of interaction of service and cleaning was considered an impossible

burden on the textile industry (23). Care labeling to instruct consumers how to preserve the initial flame resistance would be a necessity.

Although some segments of the textile industry were opposed to fire safety standards for children's sleepwear and other textile products, chemical companies were pleased with the implications. New standards from both governmental and nongovernmental sources were expected to boost demand for chemicals and plastics used in producing flame retardant textiles 35 to 45 per cent each year through 1975 (16).

Consumer advocates

While the textile industry as a whole became irrate and felt victimized, consumer advocates encouraged even more stringent standards for flame resistant textile products. Some believed that the regulations should be extended to include other apparel for children (4). For example, it has been suggested that the same criteria outlined for sleepwear should apply to girls' dresses.

Senators Moss from Utah and Magnuson from Washington, strong supporters of consumer protection, co-sponsored a bill that would create an independent consumer products safety commission with powers to set safety standards for fabric flammability among other safety regulations (2, 45).

Magnuson believed the sleepwear standard was weighted in favor of industry "at the cost of burned and scarred children."

Consumer groups generally agreed with Senator Magnuson's viewpoint (18). Betty Furness, a director of Consumers' Union, considered the provisions of the standard inadequate (2). She suggested that sleepwear sizes 7 through 14 should be included and advocated immediate enactment of the regulation. Hiricko (18, 44) of the Center of Responsive Law, said the standard would encourage the "laggard" textile industry to accelerate its research efforts.

Public

Some sources indicated that consumers were obviously exhibiting no interest in such standards (8, 41). Wernz, a Federal Trade Commission official, was quoted as saying that consumers did not choose to buy flame retarded materials when they were available in the market (29).

Attempts have been made to explain this alleged disinterest. In some cases, consumers seemed to have refused to accept unsatisfactory hand or tactile beauty which may result from some chemical flame retarding finishes (28). It has been implied that consumers were not willing to pay extra money for safety when given a choice

(4, 8, 29, 41). One theory suggested that the public seemed unaware and uninterested in the dangers of flammable fabrics because it believed it was already protected by the government (21). News media publicity about current governmental regulations of the sale of flammable textile products perhaps has conditioned the consumer to believe that legislation has shielded him from the dangers of fabric fires.

Consumers' increasing awareness of flammability of textile products has been evidenced by liability suits, primarily against clothing manufacturers, to demand compensation for fire injuries and deaths (8, 15). This public mood has been reflected in as many as six such law suits per month in recent months.

Thus, it appears that a variety of opinions exist explaining whether or not, and possible reasons why the consumer is interested or aware of flammability of textile products. There seems to be little available data to support any of the above mentioned theories.

Potential Fire Hazards Existing
in the Home

Several attempts have been made to determine exact causes of fire accidents, but unfortunately, fire statistics are limited in that only the most severe accidents are reported and investigated (30). Data collected from

death certificates in 38 states (49) attributed 68 per cent of the accidents to flames of an unknown source, 10 per cent to cigarettes, matches, and cigarette lighters, and 8 per cent to stoves or heating devices. In another study, the Department of Health, Education and Welfare reported that of 658 burn injury cases (49), 36 per cent of those accidents originated with matches, cigarette lighters or other smoking materials. McDonald (36) found that two sources of ignition, smoking materials and matches, accounted for more than 50 per cent of all injuries investigated. Thus, careless smoking seemed to be responsible for numerous clothing fire fatalities (8, 36).

Method of heating the home has also been listed as one major fire hazard (3, 4, 30, 49, 50). Open fireplaces, stoves and space heaters have been found to be frequent agents of flame ignition (4, 8, 49, 50). In a Birmingham, Alabama, study (32) of children's burns, it was found that stoves and heaters were the greatest source of ignition. In Congressional hearings on fabric flammability (20), it was indicated that families in the low-income bracket were more frequently burned because they were more likely to be exposed to fire hazards. The poor families tended to have space heaters rather than central heating as the more affluent classes might have. Analysis of data by the Department of Health, Education and Welfare

(49), indicated the highest percentages of death from fire and explosion in the winter months of December, January, and February, when such heating methods were most utilized.

Development of Survey Instrument

There are several different techniques used to collect information from a large number of people. While the interview technique might better enable the researcher to obtain unanticipated statements which reveal the respondent's thoughts and feelings, the questionnaire method has the advantage of relative ease and speed with which it can be distributed by mail over a large geographic area (7, 27, 28, 43).

Well established social researchers (25, 43) have suggested that in developing a questionnaire for mailing, the first step is to decide what information is being sought and to determine what type of questions will be used. Each point of information needed in a study should be considered in terms of whether direct questions, as opposed to indirect questions, would best obtain the desired response. The type of question in each case would depend upon the nature of the subject matter, the size of the sample in the study, the kind of analysis and interpretations intended, and the mode of administering the questionnaire.

Form of questions and responses

Questions developed for such an instrument may be classified under either of two general categories: open form and closed form (25, 27, 28, 43). Open form questions are asked in such a way that the respondent replies in his own words. This type of questioning may get more accurate information, but is often time consuming and expensive to tabulate.

Closed questions, also referred to as fixed-choice questions, have the major advantage of ease of response and tabulation (27, 28). Possible answers are suggested by the researcher when closed form is used. Check lists should include most of the probable answers, but provision should be made for additional responses. In cases where only a "yes" or "no" answer is desired, one should usually provide a third alternative such as "uncertain" or "I do not know (27, 28)."

A variation of closed question form involves pictorial responses (28). The pictorial question aids in stimulating interest among respondents and in clarifying questions for poor readers.

Selltiz, Jahoda, Deutsch, and Cook (43) have suggested that the best results are often obtained by using questions with answers to be checked by the respondent. If a check list is used, not only should all significant

choices be supplied without overlap, but order of responses must be considered. In fixed-choice questions, first and last choices tend to be most often chosen.

Questionnaire development

In preparing the first draft of a questionnaire, it has been suggested that listing topics to be included and arranging them in psychological order is preferable (43). Personal questions which the respondent might object to answering should appear toward the end of the instrument so as not to interfere with other questions. Personal and identifying data are usually placed at the end of the questionnaire form because the respondent might be more willing to answer this type of question after he has given impersonal responses. Should the respondent not be willing to answer those questions, previous responses will not be affected by his suspicious feelings or resentment (7, 43). The first draft should be re-examined and questions revised if necessary. The researcher, as well as other parties, should re-read the instrument to detect biases and technical faults (7, 27, 43).

It has been suggested that during the pretesting of the instrument, the researcher should be present to record respondents' comments verbatim as well as his own thought on reception, embarrassment and rapport (7, 43). If sub-

stantial changes are necessary, based on the pretest results, a second or third pretest is generally considered essential.

Final editing of the instrument was suggested to make it as clear and easy to use as possible (25, 27, 43). Legibility, space for replies, and clear directions about what the respondent is to do should be considered.

Respondent anonymity

Personal data about the respondent may be among information sought in a structured questionnaire. Hall (27) reported that asking for the respondent's signature did not affect returns greatly for most survey topics. However, informants may be reluctant to communicate certain information to people from their own community (24). Respondents may consider anonymity a protection from local gossip.

Vocabulary

The wording of every item should be understandable and familiar to ensure the respondent's comprehension of what is being asked of him (7, 27, 28, 43). Many standardized instruments and measures used for all socio-economic groups have reflected the middle-class background of the investigators (24). In addition, these instruments often have been pretested on persons who have a fairly

large vocabulary. Many terms, which the investigator considers common knowledge, might be difficult or impossible for a less-educated respondent to understand.

Survey instruments designed to gain information about values and attitudes, may contain items that would be taken seriously by middle-class respondents, but these same items may seem pointless or unrealistic to lower-class informants. Poor response or inappropriate instrumentation may result from boredom, fatigue, or lack of understanding by low-income and less-educated respondents (7, 24).

Source of error

As an instrument for acquiring information, the questionnaire has several sources of error. The researcher's bias or desire for certain answers might affect the way in which certain questions are asked (28, 43). Objectivity is considered necessary for a valid questionnaire.

Imperfections of design may cause inaccuracies in responses (7, 28, 43). Poor arrangement of items, lack of clear instructions on how to indicate answers, and failure to explain the purpose of the study might confuse the respondent and make his replies meaningless (28, 43).

Cover Letter

It has been suggested that each mailed questionnaire

should be accompanied by a brief letter of transmittal, requesting the respondent's aid and explaining the scope and purpose of the research (7, 28). Ethical standards demand that the informant be given truthful reasons for gathering information from him. The letter should also relate the name of the sponsor of the study being conducted.

Therefore, the literature appeared to indicate that there was concern about consumer safety in regard to flammable textile products. Attempts to legislate protection from the dangers of such materials met with varying responses from legislators, educators and industrial representatives; less is known about the reactions of the ultimate consumer. The need to investigate their reactions about the legislation of those products indicated the use of a mailed questionnaire which would permit the acquisition of such information from a large number of respondents.

CHAPTER III

PROCEDURE

An original instrument in the form of a questionnaire was designed to determine influences on consumer demand for flame resistant textile items, and practices relative to their use and care. This instrument was used for data collection and was reproduced by the mimeograph process.

Development of Instrument

Personnel from three universities were appointed to co-operatively develop the Consumer Study questionnaire for the Northeast Regional Research Project NE-79: The Pennsylvania State University, University of Rhode Island, and Virginia Polytechnic Institute and State University. Participants at each of the three institutions assumed responsibility for specific operational objectives as indicated on pages 4 and 5. Areas of investigation delegated to Virginia Polytechnic Institute and State University formed one of the major purposes of the present study.

Each institution developed questionnaire items for their areas of concentration. Pretests for clarity, organization, and general design were performed by personnel developing the instrument. Representatives from each of

the three universities made suggestions for further improvement of the total questionnaire. The Pennsylvania State University and the University of Rhode Island sent revised items to Virginia Polytechnic Institute and State University for compilation of the complete instrument used in the present study (Appendix A).

Pretesting the instrument

The questionnaire was pretested at a meeting of mothers of children enrolled in the Blacksburg Headstart Program, Blacksburg, Virginia. This low-income group was chosen to provide some assurance that vocabulary incorporated in the instrument could be comprehended by less-educated respondents who might be included in the sample. The researcher was present to record participants' comments, to note the time needed to complete the schedule, and to ascertain general reception of the questionnaire. Minor changes were made in the organization and the wording of the instrument as a result of the respondents' reactions.

Reliability test

Respondents who participated in the reliability test were 27 mothers of preschool children enrolled in the University Laboratory School, a nursery school and kindergarten in the College of Home Economics at Virginia Polytechnic Institute and State University, Blacksburg, Vir-

ginia. Limitations in selection of respondents for this preliminary study were identical to the limitations outlined in the Northeast Regional Research Project (NE-79). Participants in the regional study, and hence, in the test for reliability, were restricted to mothers of preschool children since it was believed that members of this group tended to be concerned with the use and care of textile items being investigated in the respective studies. Only literate mothers were included because it was anticipated that a mailed questionnaire would be used for data collection in the Regional Project (NE-79). The school director was contacted, and she examined the proposed instrument and scope of the study.

The questionnaires were given to the mothers of children enrolled at the University Laboratory School, Blacksburg, Virginia, as they arrived to take their children from school. A cover letter (Appendix B) explaining the study accompanied the questionnaire. Self-addressed envelopes were provided for the convenience of the respondents. In case a child departed with someone other than his mother, the personally addressed materials were delivered to the respondent by the friend or by the child.

Each mother was asked to return the completed questionnaire within seven days. They were not informed of a planned re-test, because this information might have intro-

duced biases. Twenty-seven schedules were collected at the end of the one week period.

The questionnaire was checked for reliability by the test-retest method (14). Respondents were re-tested with an identical instrument two weeks after the first sampling in order to check the reliability of the questionnaire. The same procedure was used for distributing the schedules. Only those mothers who had completed and returned the first questionnaire were contacted for the re-test. A new cover letter (Appendix C) requesting the continued co-operation of the participants was included. No reference was made to the fact that the instrument was a duplication of the first one. Again, respondents were asked to return the completed schedules within one week. Twenty-three re-test questionnaires were collected.

Responses were matched for 23 mothers by observation of questions number 1, 81, and 82. The first question required exact birth dates of children 2 to 6 years of age, and items 81 and 82 were open form questions requiring information about the occupation of the main wage earner in the family.

Reliability scores were calculated for each question according to the number of mothers whose answers were identical on test and re-test questionnaires and the total number who answered the question both times. If the

respondent failed to answer a question either or both times the schedule was administered, that respondent was not counted in calculation of reliability.

The formula used in computing reliability of each question was

$$\text{Per Cent Agreement} = \frac{2 \times \text{Number of Agreements}}{\text{Total Number of Mentions}} \times 100$$

Reliability scores were ascertained for all questions except numbers 89 through 95. Those questions were to be answered only in cases where someone was killed or injured in fire in the home of the respondent.

Method of Analysis of Data

The original data have been compiled and presented in table and narrative form. The McGuire-White Short Form of Social Status (37) was used to compute predicted social class for each respondent. This was based on the household head's education and occupation, combined with the major source of income of the family.

CHAPTER IV

RESULTS AND DISCUSSION

The results of this study will be discussed in three sections in order to report each of the three major objectives. The discussion topics will be: instrument development, reliability test results, and pilot study results.

Instrument Development

A written questionnaire (Appendix A) was developed to collect data about factors influencing consumer demand and use of flame resistant finished textile items. This method of data collection was considered the most practical in view of a planned sample size of several hundred respondents from Maine, New York, Pennsylvania, Rhode Island, Vermont and Virginia.

Ordering of items

Items in the schedule were arranged so that personal questions appeared toward the end of the questionnaire. Inquiries about respondents' previous experience with fire accidents were also placed near the end of the instrument because it was anticipated that they could also elicit

resentment or biased feelings, or could preclude respondents' volunteering information.

Early in the questionnaire schedule, questions were asked about respondents' comprehension of certain terminology used in discussion of flame resistant textile products. It was decided that such placement of that section of questions (Appendix A, questions 25-28) would more accurately determine respondents' understanding of the terms, since those words would not have appeared in the instrument up to that point.

Placement of questions to determine importance of availability of flame resistant textile items (Appendix A, questions 37-46) may need to be revised for future use of the questionnaire. That section of items should perhaps appear nearer the beginning of the instrument because respondents' indicated opinions may have reflected a social conscience effected by numerous preceding references to flame resistant products.

Form of questions and responses

Closed questions were used in almost every case for ease of tabulation as well as ease of response. Check lists in grid form were used for several items. An attempt was made to supply check lists with most of the answers that respondents were anticipated to choose. An "other" category was included but was seldom needed by the respondents,

indicating that suggested responses were reasonably adequate.

Occupation of the head of the household was determined through open form questions (Appendix A, questions 81, 82). An accurate description of the household head's occupation was necessary in calculating predicted socioeconomic status using the McGuire-White Index (37).

Pictorial questions were employed in an attempt to determine styles of garments children slept in during summer and winter (Appendix A, questions 8-21). Only 13 of the 27 respondents had girls 2 to 6 years of age living in their homes. There were 19 girls aged 2 to 6 among those 13 mothers. Totals for all three possible responses exceeded both the number of mothers with girls aged 2 to 6, and the total number of girls in that age group included in the study (Tables 1, 2). Thus, the respondents obviously were unable to discriminate among the choices "most of the time," "sometimes," and "never." Confusion was indicated by notes from respondents who did not understand whether to answer for nighttime sleeping or naptime sleeping.

Similarly unsuccessful results were obtained in asking for style of garment boys 2 to 6 years of age slept in during summer and winter. Results of these questions appear in Tables 3 and 4, although these data were not

TABLE 1 .--Style of garment girls 2 to 6 years of age sleep in during summer.

Variable	Responses							
	Most of the time		Sometimes		Never		Total	
	No.	%	No.	%	No.	%	No.	%
Regular daytime clothes	3	27.3	4	36.5	4	36.5	11	100.3*
Pajamas (Long or short sleeves, long or short pants)	5	45.5	5	45.5	1	9.1	11	100.1*
Sleepers, ski-type pajamas	0	0.0	2	18.2	9	81.8	11	100.0
Underwear	4	40.0	2	20.0	4	40.0	10	100.0
Pajamas <u>and</u> underwear, or nightgowns <u>and</u> underwear	6	54.5	4	36.5	1	9.1	11	100.1*
Short nightgown or baby doll pajamas	3	25.0	7	58.3	2	16.7	12	100.0
Long nightgowns	1	9.1	8	72.7	2	18.2	11	100.0

*Totals may not equal 100.0 due to rounding.

TABLE 2 .--Style of garment girls 2 to 6 years of age sleep in during winter.

Variable	Responses							
	Most of the time		Sometimes		Never		Total	
	No.	%	No.	%	No.	%	No.	%
Regular daytime clothes	3	27.3	4	36.5	4	36.5	11	100.3*
Pajamas (Long or short sleeves, long or short pants)	5	45.5	5	45.5	1	9.1	11	100.1*
Sleepers, ski-type pajamas	1	9.1	5	45.5	5	45.5	11	100.1*
Underwear	4	40.0	0	0.0	6	60.0	10	100.0
Pajamas <u>and</u> underwear, or nightgowns <u>and</u> underwear	5	50.0	4	40.0	1	10.0	10	100.0
Short nightgown or baby doll pajamas	0	0.0	2	20.0	8	80.0	10	100.0
Long nightgowns	3	25.0	8	66.7	1	8.3	12	100.0

*Totals may not equal 100.0 due to rounding.

TABLE 3 .--Style of garment boys 2 to 6 years of age sleep in during summer.

Variable	Responses							
	Most of the time		Sometimes		Never		Total	
	No.	%	No.	%	No.	%	No.	%
Regular daytime clothes	6	33.3	4	22.2	8	44.4	18	99.9*
Pajamas (Long or short sleeves, long or short pants)	17	94.4	1	5.5	0	0.0	18	99.9*
Sleepers, ski-type pajamas	0	0.0	3	18.8	13	81.3	16	100.1*
Underwear	10	58.8	4	23.5	3	17.7	17	100.0
Pajamas <u>and</u> underwear	11	61.1	4	22.2	3	16.7	18	100.0

*Totals may not equal 100.0 due to rounding.

TABLE 4 .--Style of garment boys 2 to 6 years of age sleep in during winter.

Variable	Responses							
	Most of the time		Sometimes		Never		Total	
	No.	%	No.	%	No.	%	No.	%
Regular daytime clothes	5	29.5	3	17.7	9	52.9	17	100.1*
Pajamas (Long or short sleeves, long or short pants)	13	76.6	3	17.7	1	5.9	17	100.2*
Sleepers, ski-type pajamas	10	55.6	4	22.2	4	22.2	18	100.0
Underwear	11	64.7	2	11.8	4	23.5	17	100.0
Pajamas <u>and</u> underwear	14	77.8	1	5.5	3	16.7	18	100.0

*Totals may not equal 100.0 due to rounding.

considered valid. Not all response totals for those questions exceeded the possible limits, but since at least one such total was too large in each table, the results were considered invalid.

The outcome of this section of the instrument clearly indicated a need for revision of format. The number of styles and the many possible response categories seemed to confuse the respondent. Also, the space necessary for that section of the questionnaire was considered too large in proportion to the total questionnaire.

The response grid for the opinion scale for determining importance of availability of flame resistant items (Appendix A, questions 37-46), included a response "couldn't care less" which none of the sample checked. It could be concluded that this category of response was not needed, perhaps because respondents considered it too close in meaning to the "no opinion" category.

Respondent anonymity

Informants were directed to omit their names from the schedules. Even though some literature (27) reported that returns were not greatly affected by asking for signatures, there seemed to be no advantages to having the respondent's name that would counterbalance the risk of suspicion and resentment it might cause in the respondent.

Vocabulary

Care was taken to design the instrument using a vocabulary that could be comprehended by less-educated respondents as well as those with better educations. The terms "flame resistant" and "inflammable" were purposely substituted with more common phrases, because it had been anticipated that some respondents would not be familiar with those terms.

Reliability Test Results

The test-retest method (14) was used to determine reliability of the instrument developed as part of this study. The instrument was first administered to 27 mothers of preschool children; 23 participated in the re-test. Reliability scores were computed for every question, except questions number 89 through number 95; respondents had been directed to answer those questions only if they had experienced a fire accident where someone was killed or injured, and none of the mothers had had such experience.

Reliability scores were based on the number of mothers whose answers were identical on both administrations of the questionnaire and the total number who answered both times. Respondents who failed to answer a question either time were omitted from calculation of reliability scores. The formula used in computing reliability of each question

was

$$\text{Per Cent Agreement} = \frac{2 \times \text{Number of Agreements}}{\text{Total Number of Mentions}} \times 100$$

Several questions had fewer total mentions than might have been expected (Table 5). Items number 18 through number 21 (Appendix A) were to be answered only by respondents who had daughters aged 2 to 6. A category titled "other" was included in several sections of the questionnaire but, in many cases, had few responses. For example, questions number 34, 46, and 52 (Appendix A) had few total mentions.

Reliability Scores

Of the original 92 questions for which reliability was computed, 25 had a perfect score of 100 per cent (Table 5); these were primarily objective questions about the respondent and her family. Seventy-seven questions produced reliability scores of 75 per cent or more. The average score for all items in the instrument was approximately 87 per cent.

One of the lowest reliability scores was computed for question number 1, asking for exact birth dates of the respondent's children 2 to 6 years of age (Table 5). In some cases, respondents listed birth dates of all their children, rather than including only those aged 2 to 6.

TABLE 5 .--Reliability test results of instrument.

Question No.	Total Mentions No.	Total Dis- agreement No.	Total Agreement	
			No.	%
1	46	6	17	73.91
2	22	2	9	81.82
3	46	0	23	100.00
4	46	0	23	100.00
5	42	1	20	95.24
6	46	0	23	100.00
7	46	0	23	100.00
8	42	3	18	85.71
9	40	2	18	90.00
10	44	3	19	86.36
11	42	5	16	76.19
12	38	4	15	78.95
13	42	6	15	71.43
14	42	0	21	100.00
15	42	1	20	95.24
16	40	3	17	85.00
17	40	7	13	65.00
18	20	0	10	100.00
19	18	1	8	88.89
20	20	0	10	100.00

TABLE 5 .--Continued.

Question No.	Total Mentions No.	Total Dis- agreement No.	Total Agreement	
			No.	%
21	20	0	10	100.00
22	46	4	19	82.61
23	46	2	21	91.30
24	44	3	19	86.36
25	42	2	19	90.48
26	42	3	18	85.71
27	42	4	17	80.95
28	40	6	14	70.00
29	40	3	17	85.00
30	40	1	19	95.00
31	42	4	17	80.95
32	40	1	19	95.00
33	44	7	15	68.18
34	8	0	4	100.00
35	44	1	21	95.45
36	44	4	18	81.81
37	44	7	15	68.18
38	44	7	15	68.18
39	42	7	14	66.67
40	42	6	15	71.43

TABLE 5 .--Continued.

Question No.	Total Mentions No.	Total Dis- agreement No.	Total Agreement	
			No.	%
41	44	7	15	68.18
42	42	8	13	61.90
43	44	6	16	72.73
44	40	5	15	75.00
45	42	8	13	61.90
46	4	1	1	50.00
47	42	1	20	95.24
48	38	1	18	94.74
49	38	1	18	94.74
50	38	0	19	100.00
51	38	0	19	100.00
52	10	0	5	100.00
53	44	1	21	95.55
54	44	3	19	86.36
55	44	3	19	86.36
56	42	2	19	90.48
57	44	1	21	95.55
58	6	0	3	100.00
59	40	4	16	80.00
60	46	2	21	91.40

TABLE 5 .--Continued.

Question No.	Total Mentions No.	Total Dis- Agreement No.	Total Agreement	
			No.	%
61	44	2	20	90.91
62	46	3	20	86.96
63	46	3	20	86.96
64	46	3	20	86.96
65	44	2	20	90.91
66	8	1	3	75.00
67	44	1	21	95.55
68	44	1	21	95.55
69	42	4	17	80.95
70	44	1	21	95.55
71	8	1	3	75.00
72	46	0	23	100.00
73	46	0	23	100.00
74	46	3	20	86.96
75	44	4	18	81.82
76	12	0	6	100.00
77	46	0	23	100.00
78	46	0	23	100.00
79	44	1	21	95.45
80	40	0	20	100.00

TABLE 5 .--Continued.

Question No.	Total Mentions No.	Total Dis- Agreement No.	Total Agreement	
			No.	%
81	42	0	21	100.00
82	36	0	18	100.00
83	40	0	20	100.00
84	44	1	21	95.45
85	46	0	23	100.00
86	20	0	10	100.00
87	46	1	22	95.65
88	40	0	20	100.00
96	40	1	19	95.00
97	22	1	10	90.91
98	12	3	3	50.00
99	18	1	8	88.89

The lowest reliability score of 50 per cent (Table 5) was computed for number 46 and number 98 (Appendix A). There were only 4 total mentions for item number 46 which was a category for "other" in determining importance of availability of selected flame resistant textile items. The low reliability score for question number 98 which asked for details on severity of injury to fire accident victims, might be explained by the possibility that the respondent was describing a different friend or relative on the re-test questionnaire, or that she did not know the victim well enough to be consistent in describing how badly he was injured.

One section of the questionnaire (Appendix A) produced particularly low reliability scores ranging from 50 to 75 per cent (Table 5). Questions number 37 through number 46 were concerned with determining importance of availability of selected flame resistant treated textile items. This was the only section of the questionnaire employing an opinion scale. That series of questions elicited reliable responses only an average of 66 per cent of the time, suggesting that respondents were inconsistent in stating the degree of importance they placed on availability of such items. A comparison of answers for each individual in the first and second administrations of the instrument indicated that although the response was not

identical on the second instrument, in many cases the respondent checked a minutely different degree of importance.

A second set of reliability scores were computed for questions number 37 through number 46, considering responses in agreement if either of the categories "important" or "very important" was chosen both times (Table 6). When these two responses were combined, the section of questions averaged a score of approximately 84 per cent reliability. This indicated that many mothers had difficulty in being consistent in stating the degree of importance placed on certain textile items, although their responses were reasonably comparable, if not exact, 84 per cent of the time. It was concluded that a more clearly defined set of responses was needed for this question to ensure accurate determination of mothers' opinions.

Pilot Study Results

The following results and discussion were based on data collected from 27 mothers of preschool children enrolled in the University Laboratory School, Virginia Polytechnic Institute and State University, Blacksburg, Virginia. Factors influencing consumer demand for flame resistant textile products, and practices relative to their use and care were investigated.

TABLE 6.--Reliability test results. (Scores re-calculated considering "important" and "very important" agreeing responses.)

Question No.	Total Mentions No.	Total Dis- Agreement No.	Total Agreement	
			No.	%
37	44	1	21	95.45
38	44	2	20	90.91
39	42	3	18	85.71
40	42	3	18	85.71
41	44	2	20	90.91
42	42	4	17	80.95
43	44	3	19	86.36
44	40	2	18	90.00
45	42	4	17	80.95
46	4	1	1	50.00

Re-calculated average for section: 83.70%

Demographic and Background Information

The sample for this study was an atypical group because 22 of the 27 respondents were predicted to be in the upper-middle socio-economic class (Table 7), according to the McGuire-White Measurement of Social Status (37). Twenty-one of them owned their homes. One-half of the 12 mothers who worked outside the home indicated that their children 2 to 6 years of age attended school in the morning hours, and stayed in a sitter's home in the afternoons.

Experience with fire accidents

In response to inquiries of their previous experience with fire accidents, 7 of the 27 respondents in this study had experienced an accidental fire (Table 8). Ten mothers knew a relative or friend who had had such accidents, and 5 of those answering the questionnaire knew a friend or relative injured or killed in fire.

Potential fire hazards in homes

Some fuels and methods used for heating the home have been considered major potential fire hazards (4, 8, 47, 49, 50). Only 2 of these respondents used a stove to heat their homes (Table 9); and they were among the 7 who had experienced fire accidents in their own homes.

Matches and smoking materials also have been suggested as major fire hazards in the home (8, 36, 49):

TABLE 7.--Characteristics of respondents.

Variable	Respondents	
	No.	%
<u>Social Class Prediction</u>		
Upper-middle	22	81.5
Lower-middle	2	7.5
Upper-lower	2	7.5
Lower-lower	1	3.7
Total	27	100.2*
<u>Children 2 to 6 Years of Age in Home</u>		
One	12	44.4
Two	10	37.0
Three	4	14.8
Four	1	3.7
Total	27	99.9*
<u>Present Residence</u>		
Rented Apartment	3	11.1
Rented House	3	11.1
Owned House	21	77.8
Total	27	100.0
<u>Place Children Stay While Mother Works</u>		
In Own Home With Sitter or Relative	2	16.6
In Sitter's Home	1	8.3
Day Care Center, School	3	25.0
School in Morning, Sitter's Home in Afternoon	6	50.0
Total	12	99.9*

*Totals may not equal 100.0 due to rounding.

TABLE 8.--Previous experience with fire accidents.

Variable	Respondents	
	No.	%
<u>Personal Experience</u>		
Accident With Fire in Home	7	25.9
No Experience With Fire In Home	20	74.1
Total	27	100.0
<u>Friend's Experience</u>		
Relative or Friend With Fire Accident Experience	10	40.0
No Relative or Friend With Fire Accident Experience	15	60.0
Total	25	100.0
<u>Friend Injured or Killed</u>		
Friend or Relative Killed or Injured in Fire Accident	5	50.0
No Friend or Relative Killed or Injured in Fire Accident	5	50.0
Total	10	100.0

TABLE 9.--Potential fire hazards existing in the home.

Variable	Respondents	
	No.	%
<u>Method of Heating Home</u>		
Furnace	13	48.1
Stove	2	7.4
Wall, Baseboard, Ceiling Heaters	6	22.2
Combination	4	14.8
Other	2	7.4
Total	27	99.9*
<u>Major Fuel for Heating Home</u>		
Electricity	12	44.4
Oil	12	44.4
Gas	2	7.4
Wood	1	3.7
Total	27	99.9*
<u>Smokers in the Home</u>		
Cigarette Smokers	8	29.6
Pipe Smokers	1	3.7
Non-smokers	18	66.7
Total	27	100.0

*Totals may not equal 100.0 due to rounding.

There were 8 homes with cigarette smokers and 1 with a pipe smoker in residence (Table 9). Four of these 9 respondents had experienced fire accidents, although the cause of those accidents was not ascertained in the questionnaire.

Laundering practices

Respondents were asked to place themselves in the hypothetical situation of having purchased flame resistant treated sleepwear for their children. They were given label information which might have appeared on such an item and were then asked what methods of laundering and drying they would use in maintaining this particular sleepwear. Most of them indicated use of automatic washers and dryers in their own homes (Table 10). Although the label carried a warning, "Do not use chlorine bleach," 2 respondents indicated they would use such bleach. This seems to indicate a need to educate consumers to read and adhere to label information.

The mothers were asked to give the same information about methods they generally used in maintaining presently owned children's sleepwear. Results (Table 11) were closely comparable to those obtained in determining washing and drying methods in the hypothetical situation.

Respondents chose the same brands of detergent or soap for

TABLE 10.--Methods for maintenance of "hypothetical"
flame resistant treated sleepwear.

Variable	Respondents	
	No.	%
<u>Laundrying Method</u>		
Wash by Hand	2	7.4
Wringer Washer	1	3.7
Automatic Washer at Home	24	88.9
Total	27	100.0
<u>Drying Method</u>		
Line Dry	6	22.2
Dryer Dry	21	77.8
Total	27	100.0

TABLE 11.--Methods used in general maintenance of children's sleepwear.

Variable	Respondents	
	No.	%
<u>Laundrying Method</u>		
Wringer Washer	1	4.0
Automatic Washer at Home	23	92.0
Coin-operated Washer, Laundromat	1	4.0
Total	25	100.0
<u>Drying Method</u>		
Line Dry	4	15.4
Dryer Dry	21	80.8
Other	1	3.8
Total	26	100.0

the usual maintenance of children's sleepwear that they indicated for the hypothetical garments; a total of 12 different brands were listed. Since none of the mothers indicated they generally used a soap, no conclusions could be drawn as to whether or not mothers were heeding the "Do not use soap" warning on the label information.

Purchasing Behavior

The most frequent place of purchase for children's sleepwear, sheets and pillowcases, and curtains and draperies was examined. The discount department store, mail-order catalog, and regular department store were indicated as the most frequent source of purchase for children's sleepwear (Table 12). When asked whether they presently used flame resistant treated textile items as children's sleepwear and robes, mattress pads, curtains and draperies, carpets and rugs, bedspreads, a large majority of responses in each category of textile products was "no" (Table 13). Only 1 respondent indicated present use of flame resistant treated children's sleepwear or robes. Although most of the respondents indicated they had not tried to buy these specific flame resistant textile items, attempted purchase was greatest for children's sleepwear and robes (22.2 per cent), and curtains and draperies (25.9 per cent).

Respondents were asked, by use of pictorial ques-

TABLE 12.--Place of purchase for selected textile items.

Variable	Textile Item					
	Children's sleepwear		Sheets, pillowcases		Curtains, draperies	
	No.	%	No.	%	No.	%
Discount department store	6	23.1	5	19.2	1	3.8
Regular department store	8	30.8	10	38.6	13	50.0
Specialty store	1	3.8	0	0.0	0	0.0
Variety store	1	3.8	3	11.5	1	3.8
Mail-order catalog	7	26.9	5	19.2	4	15.4
Other	3	11.5	2	7.7	6	23.1
I do not buy them.	0	0.0	1	3.8	1	3.8
Total	26	99.9*	26	99.9*	26	99.9*

*Totals may not equal 100.0 due to rounding.

TABLE 13.--Purchasing behavior toward selected flame resistant textile items.

Variable	Responses					
	"Yes"		"No"		Total	
	No.	%	No.	%	No.	%
<u>Items Presently Owned</u>						
Children's sleepwear, robes	1	3.9	25	96.2	26	100.1*
Mattress pads	0	0.0	25	100.0	25	100.0
Curtains, draperies	3	12.0	22	88.0	25	100.0
Carpets, rugs	1	4.0	24	96.0	25	100.0
Bedspreads	0	0.0	25	100.0	25	100.0
Other	1	16.7	5	83.4	6	100.1*
<u>Items Attempted to Purchase</u>						
Children's sleepwear, robes	6	22.2	21	77.8	27	100.0
Mattress pads	2	7.5	25	92.6	27	100.1*
Curtains, draperies	7	25.9	20	74.1	27	100.0
Carpets, rugs	3	11.1	24	88.9	27	100.0
Bedspreads	1	3.7	26	96.3	27	100.0
Other	0	0.0	5	100.0	5	100.0

*Totals may not equal 100.0 due to rounding.

tions, which styles of garments their children 2 to 6 years of age slept in during summer and winter. This type of question seemed to be unsuccessful, as was reported on pages 32 and 33. Tables 1, 2, 3, and 4 (pages 34-37) illustrate the outcome.

Influences on Demand for Flame Resistant Treated Textile Items

Knowledge of flame resistant treated clothing

Most of the respondents who were aware of clothing treated for flame resistance, said they had become informed of such items through newspapers and magazines, and radio and television media (Table 14). Almost 80 per cent of those responding had heard of flame resistant clothing from newspapers and magazines; approximately 62 per cent had heard about them from radio or television.

Knowledge of federal legislation

Approximately two-thirds of the 26 responding mothers indicated that they were unaware of federal legislation (47, 48) preventing the sale of flammable carpets and rugs, even though the regulations have been in effect since April, 1971 (Table 14). Slightly more than two-fifths of the sample did not know of such legislation (46) in regard to children's sleepwear.

TABLE 14.--Knowledge of flame resistant treated clothing and legislation preventing sale of flammable fabrics.

Variable	Respondents					
	"Yes"		"No"		Total	
	No.	%	No.	%	No.	%
<u>Knowledge of Flame Resistant Treated Clothing</u>						
Talking with Friends	7	29.2	17	70.9	24	100.1*
Talking with Sales People	2	8.3	22	91.7	24	100.0
Newspapers, Magazines	19	79.2	5	20.8	24	100.0
Extension Meetings, Bulletins	2	8.3	22	91.7	24	100.0
Radio, Television	16	61.5	10	38.5	26	100.0
Other	2	40.0	3	60.0	5	100.0
<u>Awareness of Federal Legislation Preventing Sale of Flammable Fabrics</u>						
Carpets, Rugs	8	30.8	18	69.2	26	100.0
Children's Sleepwear, Robes	15	57.7	11	42.3	26	100.0

*Totals may not equal 100.0 due to rounding.

Comprehension of terminology

Whether or not respondents understood certain terminology that might be used by information services in publicizing flame resistant products, or on labeling of such textile products (3, 30) was examined. Large majorities of the respondents indicated they knew the meaning of "flammable" and "non-flammable" (Table 15). Of the 25 responding, 9 indicated a misconception of the term "flame resistant"; an even larger portion of the respondents did not understand the word "inflammable." These results tend to indicate a need for providing such information to consumers.

Importance of flame resistant treated textile items

An attempt was made to investigate claims (8, 41) that consumers had no interest in flame resistant textile items. When mothers indicated how important they considered the availability of certain textile items (Table 16), 85 to 95 per cent of those responding in every category considered such availability either "important" or "very important."

Willingness to pay more money

Contrary to many reports (4, 8, 29, 41), the mothers in this study were willing to pay extra money for selected textile items (children's dresses, mattresses, mattress

TABLE 15.--Comprehension of terminology used in labeling
flame resistant textile products.

Variable	Respondents	
	No.	%
"Flammable"		
Correct Definition Indicated	24	96.0
Incorrect Definition Indicated	1	4.0
Total	25	100.0
"Non-flammable"		
Correct Definition Indicated	22	88.0
Incorrect Definition Indicated	3	12.0
Total	25	100.0
"Flame resistant"		
Correct Definition Indicated	16	64.0
Incorrect Definition Indicated	9	36.0
Total	25	100.0
"Inflammable"		
Correct Definition Indicated	11	47.8
Incorrect Definition Indicated	8	34.8
Did Not Know	4	17.4
Total	23	100.0

TABLE 16.--Importance of availability of selected flame resistant items to consumers.

Variable	Degree of Importance									
	No Opinion		Not Important		Important		Very Important		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Children's sleep-wear, robes	1	3.7	1	3.7	8	30.0	17	63.0	27	100.0
Children's dresses	1	3.7	1	3.7	8	30.0	17	63.0	27	100.0
Mattresses	3	11.1	1	3.7	8	30.0	15	55.6	27	100.0
Mattress pads	3	11.5	0	0.0	10	38.5	13	50.0	26	100.0
Blankets	0	0.0	0	0.0	9	33.4	18	66.7	27	100.0
Bedspreads	2	7.5	1	3.7	8	30.0	16	59.3	27	100.0
Kitchen curtains or draperies	0	0.0	1	4.2	8	33.3	15	62.5	24	100.0
Other curtains or draperies	3	11.5	1	3.9	12	46.2	10	38.5	26	100.0
Carpets, rugs	1	3.7	0	0.0	14	51.9	12	44.4	27	100.0
Other	1	33.3	0	0.0	0	0.0	2	66.7	3	100.0

pads, blankets, bedspreads, and curtains and draperies) (Table 17). No attempt was made in this study to determine how much more money these consumers would be willing to pay.

The pretest of the original questionnaire indicated that the instrument was satisfactory if the above suggested revisions were incorporated. The reliability of the greater portion of the questionnaire items was considered acceptable. Pilot study results gave some indication of the attitudes, knowledge, and behavior of consumers toward flame resistant products, but no definite conclusions could be drawn from such a small sample. These results seemed to indicate a need for providing consumers with information about textile products treated to resist flame, so that they may more effectively practice their rights and responsibilities in the marketplace.

TABLE 17.--Willingness to pay extra money for selected
flame resistant textile items.

Variable	Response					
	"Yes"		"No"		Total	
	No.	%	No.	%	No.	%
Children's dresses	18	72.0	7	28.0	25	100.0
Mattresses	17	63.0	10	37.0	27	100.0
Mattress pads	17	65.5	9	34.6	26	100.1*
Blankets	23	88.5	3	11.5	26	100.0
Bedspreads	20	74.1	7	25.9	27	100.0
Kitchen curtains, draperies	21	80.8	5	19.2	26	100.0
Other curtains, draperies	18	66.7	9	33.3	27	100.0
Other	5	71.4	2	28.6	7	100.0

*Totals may not equal 100.0 due to rounding.

CHAPTER V

SUMMARY

Statements that flame resistant textiles are important to the well-being of families have been substantiated by innumerable burn injury and death statistics. A wave of legislation to protect the consumer, renewed in the late 1960's, has evolved into the current standards for flammability of children's sleepwear and carpets and rugs, and may soon be expanded to include more items of apparel and household textiles. In spite of this apparent concern for the consumer, none of the available literature indicated any empirical evidence as to whether or not the consumer has any interest in flame resistant textile items.

The major purposes of the present study were: 1. cooperate in development of an original instrument to determine consumer demand and use of flame resistant textile items; 2. test reliability of the total instrument through the test-retest method; 3. serve as a pilot study for the Northeast Regional Textiles and Clothing Research Project (NE-79) in determining factors influencing consumer demand for flame resistant textile items, and practices relative to their use and care.

The original instrument used in data collection was developed cooperatively by three universities involved in the Northeast Regional Research Project (NE-79). The questionnaire was administered to 27 mothers of preschool children in Blacksburg, Virginia; 23 of the mothers participated in a re-test 14 days later to establish reliability of the instrument. Reliability scores were calculated for each question based on the number of mothers whose answers were identical on test and re-test, the number in disagreement, and the total number who answered the question on both test and re-test. Pilot study results were compiled and presented in table and narrative form, and suggestions were made for further revision of the test instrument.

Major Findings

Of the original 92 questions for which reliability was computed, 25 had a perfect score of 100 per cent. The average reliability score for items in the instrument was approximately 87 per cent. An opinion scale to determine the importance consumers placed on availability of flame resistant treated textile items produced low reliability scores which ranged from 50 to 75 per cent. In many cases, the respondent chose a minutely different degree of importance on the second questionnaire, indicating that a more clearly defined set of responses was needed for that sec-

tion of the questionnaire. A need for clearer instructions was indicated for question number one, asking for exact birth dates of children 2 to 6 years of age.

A large majority of the respondents in this study did not presently use flame resistant treated textile items, nor had they attempted to purchase them. A limited availability of such textile products must be considered here. Large portions of the sample indicated they considered availability of selected flame resistant textile items (children's sleepwear, robes, dresses; mattresses, mattress pads, blankets, bedspreads; curtains, draperies; carpets, rugs) either "important" or "very important." Respondents said they were willing to pay extra money for textile items treated to resist flame.

Most of the mothers in this study indicated an awareness of flame resistant clothing, the major source of such knowledge being television and radio. About two-thirds of them were unaware of federal legislation preventing the sale of flammable carpets and rugs, and almost one-half of them did not know of such legislation in regard to children's sleepwear. Almost one-third of the mothers indicated a misconception of the term "flame resistant"; an even larger portion of the sample did not understand the word "inflammable." These findings indicated a need for educating the consumer of flammability legislation as well

as related information.

Inconclusive results were obtained from a section of pictorial questions to determine styles of garments children slept in during summer and winter. The number of styles and the many possible response categories seemed to confuse the respondent; a need for revision of format was clearly indicated.

Limitations of the Study

The present study had several limitations. The sample was atypical because most of the respondents were wives of Virginia Polytechnic Institute and State University professors. A great majority of the mothers were upper-middle class which did not allow sufficient distribution of socio-economic status nor educational attainment. The small size of the sample was also a limiting factor. A longer period of time between the first and second administration of the questionnaire would have been desirable because duplication of results can be affected by the length of time between test and re-test (14). Having personnel from three universities involved in development of the instrument drew on a broader range of expertise and thinking than would have been possible otherwise; however, this situation was somewhat limiting from aspects of the necessary deadlines in completing stages of the instrument

development, as well as in the difficulty in meeting to discuss and compile suggestions.

Implications for Further Study

The efforts of this pilot investigation will be continued by personnel from the universities involved in the Northeast Regional Clothing and Textiles Research Project (NE-79). Some implications for that continuation were an outgrowth of the present study: 1. Revision of the section of the questionnaire designed to determine styles of garments children slept in; 2. A more clearly defined set of responses for the opinion scale to determine importance of availability of flame resistant treated textile items; 3. Minor revisions in arrangement of questionnaire items.

A larger sample might reveal a correlation between previous fire experience and other variables, such as awareness of flammability legislation, importance placed on flame resistant treated textile items, and use of flame resistant treated items. Correlations of the above variables might also be investigated in comparison to education of head of household, home ownership, number of small children in the home, whether or not the mother works outside the home, fuel and method of heating used in the home, and the number of people who smoke in the home.

The following are suggestions for further study in this area:

1. More complete investigations of fire accident experiences involving textile products, and how those experiences affect attitudes toward flame resistant treated textile items.

2. Investigation periodically (perhaps yearly) to determine whether or not current legislation will affect the number of injuries or deaths caused by fire accidents.

3. A detailed market study approximately one year after flame resistant treated textile items are widely available, to determine consumer reaction and acceptance of those items.

4. A survey conducted at the present time, then repeated after flame resistant treated textile items are widely available, to determine whether consumers will change laundering and drying methods to adhere to requirements in maintenance of such items.

5. An investigation to determine whether or not consumers can successfully be educated to assume more responsibility for their own personal safety.

APPENDIX A

CONSUMER PRACTICES

This is not a test; there are no right or wrong answers. Just answer the questions as they apply to your situation.

Please be certain you answer once for every numbered question if it applies to you.

1. Give the birth date of children (2-6 years of age) living in your home.

	day	month	year		day	month	year
Girls	_____	_____	_____	Boys	_____	_____	_____
	_____	_____	_____		_____	_____	_____
	_____	_____	_____		_____	_____	_____

2. If you work outside your home, where do the children (2-6 years of age) stay while you work?

in your home, alone
 in your home, with a sitter or relative
 in a sitter's or relative's home
 in a day care center, nursery school, private or public school
 other (explain) _____

3. Where do you live now?

rented apartment
 rented house
 rented trailer
 owned house
 owned trailer
 other (explain) _____

4. Who lives in your home other than you? (Check as many as needed.)

husband
 child (or children)
 boarders
 employees
 others (explain) _____

5. How do you heat your home? (Check more than one if you need to.)

stove
 wall heaters
 portable heaters
 furnace
 other (explain) _____

6. What is the one major fuel for heating your home? (Check only one.)

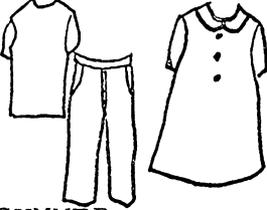
wood
 coal
 electricity
 gas
 oil
 other (explain) _____

7. What part of your home is heated in the winter? (Check all that apply.)

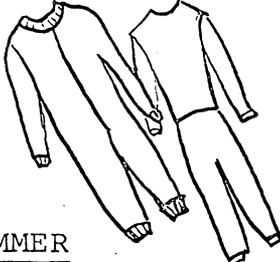
entire home
 living room
 kitchen
 bedroom(s)
 other (explain) _____

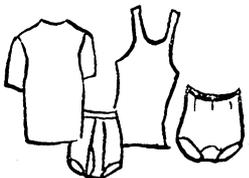
For each of the following pictures please check (✓) the statement that best describes how frequently your child (2-6 years of age) sleeps in the pictured garment both in the summer and in the winter.

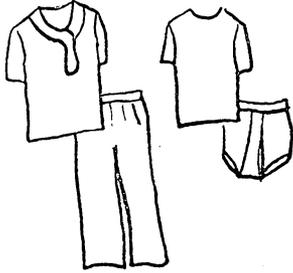
If you have a son and daughter (2-6 years of age), please answer for both children in the spaces provided in each box.

		
Regular Daytime Clothes (Dresses, pants, shirts, blouses)		
8. <u>SUMMER</u>	<u>GIRLS</u>	<u>BOYS</u>
1. Most of the time		
2. Sometimes		
3. Never		
9. <u>WINTER</u>		
1. Most of the time		
2. Sometimes		
3. Never		

		
Pajamas - Long or short sleeves, Long or short pants		
10. <u>SUMMER</u>	<u>GIRLS</u>	<u>BOYS</u>
1. Most of the time		
2. Sometimes		
3. Never		
11. <u>WINTER</u>		
1. Most of the time		
2. Sometimes		
3. Never		

		Sleepers or Ski-type Pajamas		
		<u>GIRLS</u>	<u>BOYS</u>	
		12. <u>SUMMER</u>		
		1. Most of the time		
		2. Sometimes		
13. <u>WINTER</u>				
1. Most of the time				
2. Sometimes				
3. Never				

		Underwear (T-shirts, shorts, panties, diapers)		
		<u>GIRLS</u>	<u>BOYS</u>	
		14. <u>SUMMER</u>		
		1. Most of the time		
		2. Sometimes		
15. <u>WINTER</u>				
1. Most of the time				
2. Sometimes				
3. Never				



Pajamas and Underwear
or
Nightgowns and Underwear

16. <u>SUMMER</u>	<u>GIRLS</u>	<u>BOYS</u>
1. Most of the time		
2. Sometimes		
3. Never		
17. <u>WINTER</u>		
1. Most of the time		
2. Sometimes		
3. Never		



Short Nightgown or
Baby Doll Pajamas

18. <u>SUMMER</u>	<u>GIRLS</u>
1. Most of the time	
2. Sometimes	
3. Never	
19. <u>WINTER</u>	
1. Most of the time	
2. Sometimes	
3. Never	

		Long Nightgowns
20.	<u>SUMMER</u>	<u>GIRLS</u>
	1. Most of the time	
	2. Sometimes	
	3. Never	
21.	<u>WINTER</u>	
	1. Most of the time	
	2. Sometimes	
	3. Never	

Where do you most often buy the following? Check one store only for each of the three items.

	22	23	24
TYPE OF STORE	Children's sleepwear	Sheets Pillow Cases	Curtains Draperies
Discount department store (example, Hill's)			
Regular department store (example, Leggett)			
Children's clothing store (only children's clothing)			
Mail-order catalog (example, Sears, Roebuck)			
Variety store (example, TG&Y)			
I do not buy them			
other (explain			

Tell me what each of these words mean to you. (Put the number of your answer in the space beside each word.)

- | | | |
|---------------------|-------|--|
| 25. flammable | _____ | 1. Will not burn when touched with a flame. |
| 26. non-flammable | _____ | 2. Will burn when touched with a flame. |
| 27. flame resistant | _____ | 3. Will burn when touched with a flame, but stops burning when the flame is removed. |
| 28. inflammable | _____ | 4. I do not know. |

Have you ever heard about clothing that is made to resist burning? Check Yes or No for each of the following sources:

	Source	Yes	No
29.	Talking with friends or family		
30.	Talking with sales people		
31.	Newspapers or magazines		
32.	Extension meetings or bulletins		
33.	Radio or television		
34.	Other (explain)		

Have you ever heard about any federal rules which prevent the sale of certain textile items, especially if they burn easily? Check Yes or No for each of the following items:

	Items	Yes	No
35.	Carpets and rugs		
36.	Children's sleepwear and robes		

How important do you think it is to have the following items made to resist burning? Please answer for each item.

	Couldn't Care Less	Not Impor- tant	No Opinion	Impor- tant	Very Important
37.	Children's sleepwear & robes				
38.	Children's dresses				
39.	Mattresses				
40.	Mattress pads				
41.	Blankets				
42.	Bedspreads				
43.	Kitchen cur- tains or draperies				
44.	Other cur- tains or draperies				
45.	Carpets or rugs				
46.	Other (explain)				

Do you have any textile items that are labeled flame resistant, flame retardant, or non-flammable? Check Yes or No for each of the following items:

	Items	Yes	No
47.	Children's sleepwear and robes		
48.	Mattress pads		
49.	Curtains or draperies		
50.	Carpets or rugs		
51.	Bedspreads		
52.	Other (explain)		

Have you ever tried to buy any textile items that are labeled flame resistant, flame retardant, or non-flammable? Check Yes or No for each of the following items:

	Items	Yes	No
53.	Children's sleepwear and robes		
54.	Mattress pads		
55.	Curtains or draperies		
56.	Carpets or rugs		
57.	Bedspreads		
58.	Other (explain)		

Would you be willing to pay extra for the following textile items if they were made to resist burning? Check Yes or No for each of the following items:

	Yes	No
59. Children's dresses		
60. Mattresses		
61. Mattress pads		
62. Blankets		
63. Bedspreads		
64. Kitchen curtains or draperies		
65. Other curtains or draperies		
66. Other (explain)		

Suppose you bought some sleepwear similar to those your child wore last night, and they were made to resist burning. The following care instructions were given on the label:

MACHINE WASH TUMBLE DRY MAY BE HAND WASHED USE ANY GOOD DETERGENT DO NOT USE SOAP DO NOT USE CHLORINE BLEACH COMMERCIAL LAUNDRIES SHOULD NOT USE ACID SOUR PROCESS
--

Please answer the following questions concerning how you would care for the flame resistant sleepwear.

67. Check the method that best describes the way you would wash the flame resistant sleepwear.

wash by hand at home
 wash in wringer washer at home
 wash in automatic washer at home
 wash in coin-operated washer at laundromat
 take them to a commercial laundry
 other (explain) _____

68. Check the method that you would use to dry the flame resistant sleepwear.

line dry
 dryer dry
 other (explain) _____

69. Please give the brand name of the detergent or soap you would use for washing the flame resistant sleepwear.

70. Would you use a bleach?

yes
 no

71. If yes, give the brand name of the bleach you would use.

72. Check the method that best describes the way you generally clean the sleepwear that you child wore last night.

wash by hand at home
 wash in wringer washer at home
 wash in automatic washer at home
 wash in coin-operated washer at laundromat
 take them to a commercial laundry
 other (explain) _____

73. Check the method that best describes the way you generally dry the sleepwear that you child wore last night.

line dry
 dryer dry
 other (explain) _____

74. Please give the brand name of the detergent or soap you generally use for washing the sleepwear your child wore last night.

75. Do you ever bleach the sleepwear your child wore last night?

yes
 no

76. If yes, give the brand name of the bleach you usually use.

PLEASE TELL ME ABOUT YOU AND YOUR FAMILY.

77. What is your age?

<input type="checkbox"/> 18-24 years	<input type="checkbox"/> 45-54 years
<input type="checkbox"/> 25-34 years	<input type="checkbox"/> 55-64 years
<input type="checkbox"/> 35-44 years	<input type="checkbox"/> 65 years or older

78. Who is the head of your household, that is, the main wage earner?

husband
 yourself
 other person

79. What is the education level of the head of the household?

less than 8th grade
 finished 8th grade
 some high school
 high school diploma
 some college or post high school professional training
 graduate from four-year college
 education beyond bachelor's degree
 other (explain) _____

80. What is your education? (If you are head of your household, go to question #81.)
- less than 8th grade
 finished 8th grade
 some high school
 high school diploma
 some college or post high school professional training
 graduate from four-year college
 education beyond bachelor's degree
 other (explain) _____
81. What is the occupation of the main wage earner in your family?
- _____
82. Please describe what the main wage earner does on the job.
- _____
- _____
83. What is your usual job? (If you are head of your household, go to question #84.)
- full time homemaker
 full time employment (30-40 hours per week)
 part time employment (less than 30 hours per week)
 employed, but do the work at home
 other (explain) _____
84. What was the total income for your family during the past 12 months?
- | | |
|--|---|
| <input type="checkbox"/> Under \$2,000 | <input type="checkbox"/> \$4,000-\$4,999 |
| <input type="checkbox"/> \$2,000-\$2,999 | <input type="checkbox"/> \$5,000-\$5,999 |
| <input type="checkbox"/> \$3,000-\$3,999 | <input type="checkbox"/> \$6,000 and over |
85. What is the one major source of your family's income?
- inherited savings and investments
 savings and investments
 profits, fees from business or profession
 salary and/or commissions and/or monthly check
 weekly checks and hourly wages
 odd jobs, seasonal work
 public relief or assistance

86. Are there people living in your home who smoke?
(Check all that apply.)
- _____ cigarettes---How many people? _____
 _____ cigars---How many people? _____
 _____ pipes---How many people? _____
87. Have you ever had an accident with fire in your home?
 _____ yes
 _____ no
88. Was anyone killed or injured by the fire?
 _____ yes
 _____ no

IF ANSWER TO QUESTION #88 IS "NO," GO TO QUESTION #96.

89. Who was killed or injured? (Check all that apply.)
- _____ yourself
 _____ husband
 _____ child (children)---age _____
 _____ other (explain) _____
90. How badly was the person(s) injured?
- _____ first aid treatment at the scene of the fire
 _____ treated in hospital and released
 _____ stayed in hospital
 _____ dead on arrival at hospital
 _____ died in hospital
 _____ other (explain) _____
91. In what room(s) did the fire start? _____

92. To what room(s) did it spread? _____

93. What do you think was the cause of the fire?
- _____ chimney
 _____ over-heated stove
 _____ cigarette
 _____ matches
 _____ faulty wiring
 _____ cooking accident
 _____ furnace
 _____ other (explain) _____

94. What was the injured person doing at the time of the fire?

95. What was the injured person wearing at the time of the fire?

night clothes
 daytime clothes
 other (explain) _____

96. Do you know anyone, or are you related to anyone else who has had an accident with fire?

yes
 no

97. If yes, was anyone killed or injured by the fire?

yes
 no

98. How badly was the person(s) injured?

first aid treatment at the scene of the fire
 treated in hospital and released
 stayed in hospital
 dead on arrival at hospital
 died in hospital
 other (explain) _____

99. How well do you know this person?

close friend
 barely know him
 relative---How is he related? _____

APPENDIX B



VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

DEPARTMENT OF CLOTHING, TEXTILES AND RELATED ART

February 16, 1972

Dear Parent:

In recent months, the growing concern of government, industry, and consumers with the flammability of clothing and textile products has received widespread coverage in local and national news. We too, are concerned with this issue. As a result of our interest, a research project has been developed to study the problem. People will be contacted in several nearby states to help supply us with information. In Virginia the study is being conducted by clothing and textile faculty members and students at Virginia Polytechnic Institute and State University.

We are interested in gathering information on home-makers' practices, experiences, and opinions about some of the new fabrics being used in many clothing and household textile items. We are also interested in knowing whether you, your family, or close friends have had any experiences with fire. This information, we feel, will be a great help to all people concerned in bringing a better and safer product to you and your family.

Your help, then, in completing the attached questionnaire will be greatly appreciated. For research purposes it is very important that you answer all the questions in every section of this questionnaire. We believe that only through your honest answers to all the questions can this project be a success.

Information you furnish us will be kept strictly confidential and used only for the statistical purposes of this study.

Thank you for your help in supplying us with this much needed information. I hope to collect your completed questionnaire tomorrow as your child arrives at school.

E. Marie Smythia
Graduate Student
Clothing, Textiles and Related Art

Enid F. Tozier, Ph.D.
Associate Professor
Clothing, Textiles and Related Art

APPENDIX C



VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061

DEPARTMENT OF CLOTHING, TEXTILES AND RELATED ART

March 1, 1972

Dear Parent:

Your help is needed once again in collecting information for a research project to study consumers' attitudes and practices toward flame resistant clothing and textile products. We appreciate your cooperation in completing and returning the first questionnaire. The nature of this study requires that we ask each respondent to answer a second questionnaire at this time.

It is important that you answer all questions. Information you furnish us will be kept confidential and used only for statistical purposes of this study.

Thank you for your help in supplying us with this information. I will plan to collect your completed questionnaire tomorrow as your child arrives at school. If this is not convenient, the questionnaire must be returned by March 8, either by mail or delivery to the Laboratory School.

Sincerely,

E. Marie Smythia
Graduate Student, Clothing,
Textiles and Related Art

Enid F. Tozier^u
Associate Professor, Clothing,
Textiles and Related Art

EMS/cmh

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AN INSTRUMENT TO INVESTIGATE CONSUMER DEMAND, USE
AND CARE OF FLAME RESISTANT TREATED TEXTILE ITEMS

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(Abstract)

Major purposes were: 1. assist in developing an instrument for Regional Research Project (NE-79) to determine consumer demand and use of flame resistant treated textile items; 2. test reliability of total instrument; 3. conduct a pilot study investigating factors influencing consumer demand for these textile items and practices relative to their use and care. Average reliability score of all items was 87.4 per cent when tested and re-tested with 23 mothers of preschool children. Questions using an opinion scale to determine importance of availability of flame resistant textile items tended to be unreliable. Pilot study data from mailed questionnaires to 27 mothers indicated need for major revision of questions to determine styles of sleeping garments for children. Over 85 per cent of the mothers considered availability of flame resistant treated textile items important, and a large majority reported willingness to pay extra money for them. Most mothers did not indicate present use of flame resistant children's sleepwear and robes, mattress pads, curtains,

draperies, carpets, rugs, and bedspreads; less than one-fourth of the respondents had attempted to purchase them. Over one-half the mothers were unaware of federal legislation preventing future sale of flammable textile products. About one-third of the respondents did not know the correct definition of "flame resistant," and over one-half could not define "flammable."