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THE UNIVERSITY OF ALBERTA

DEVELOPMENT OF METHODOLOGY FOR DETERMINING THE CONSUMER ACCEPTANCE OF A NEW CROP IN A DEVELOPING COUNTRY

BY

SALLY M. VOGEL

A DISSERTATION

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF DOCTOR OF PHILOSOPHY

IN

FOODS

FACULTY OF HOME ECONOMICS

EDMONTON, ALBERTA

FALL, 1987

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a dissertation entitled DEVELOPMENT OF METHODOLOGY FOR DETERMINING THE CONSUMER ACCEPTANCE OF A NEW CROP IN A DEVELOPING COUNTRY submitted by SALLY M. VOGEL in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY IN FOODS in FACULTY OF HOME ECONOMICS.

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ABSTRACT

A methodology for determining the consumer acceptance of new crops in developing countries was developed and evaluated among a recent immigrant population in Edmonton, Canada. In this research, crop acceptance was defined as an attitude, belief or feeling that is measured by showing respondents actual samples of a crop while instructing them to think of using the crop in a specific dish. Selected concepts from the theory of Reasoned-Action, proposed by Ajzen and Fishbein (1980), were also used as a basis for the methodology. Respondents for this research were members of 6 East Indian Associations. They were selected from a range of ethnic communities within one city to eliminate the need for a costly community by community survey across a region. Alternative procedures for the methodology were developed from the content of 17 international studies on the consumer acceptance of crops and from related North American literature. Sound and reliable procedures for the methodology were identified by evaluating all of the alternative procedures in a study of the consumer acceptance of Eston lentils. The developed methodology consists of five background studies that are followed by a questionnaire-based survey. It includes procedures for collecting information on the crops, consumers of the crops, conditions for using the crops and characteristics that consumers use to evaluate the acceptability of the selected new crop. Semantic differentials with

seven points are used to provide numerical scores for crop acceptance. Researchers in cereal and pulse improvement programs may best use these findings to complement laboratory grain quality tests.

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CHAPTER I

INTRODUCTION

For many people in the developing world, food shortages and famine are an ever present concern. These are a result of both increased demand for food due to population increases and factors which cause the supply of food to be unstable. An important effort is being made by national and international agricultural researchers to stabilize and increase yields of food crops in the developing world. In the semi-arid and humid tropics, hundreds of local crop varieties with a range of production characteristics have been identified. At the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) in Hyderabad, India, for example, over 16,500 accessions of sorghum are being stored (House, 1981). These accessions have differing drought, pest and disease resistance characteristics. The sorghums vary in size, shape, color, milling, germination, cooking and many other consumption-related characteristics.

Over the years, researchers at international agricultural research centers have become aware of the importance of both production and consumption characteristics to consumer acceptance of new crop varieties. At CIMMYT (International Maize and Wheat Improvement Center) in El Batan, Mexico, researchers found that the appearance and processing characteristics of maize varieties with an "opaque 2" gene reduced consumer acceptance of these varieties (Brown, 1975; Poey and Poey, 1975; de Sao Jose, 1975). Researchers using varieties that were

developed at IITA (International Institute for Tropical Agriculture) in Ibadan, Nigeria observed that a long cooking time reduced consumer acceptance of some cowpea cultivars (Dovlo, 1975).

To ensure that newly released crop cultivars have both desirable production and consumption characteristics, researchers in many countries have endeavored to determine consumer acceptance of different crop cultivars. In West Africa, for example, a network of studies related to cowpea preferences was initiated between 1973 and 1975 (Dovlo, 1975; Smirl and Zoaka, 1974; Steckle and Ewanyk, 1974; Williams, 1974). These studies were based on surveys of large population samples. Information about consumer practices with, and attitudes toward, the grain was collected. As a result of such recognition of the importance of consumer acceptance in crop development, international agricultural research centers have broadened their research interests beyond crop production research. Studies of the processing and sensory characteristics of foods derived from crops are becoming an integral part of crop improvement research (CGIAR, 1976). At ICRISAT and CIMMYT, for example, staff members have been recruited who have expertise in the measurement of grain processing characteristics.

At a national level in many developing countries, efforts have also been made to clarify the primary uses of, or products made from, food crops. One example of this work is a classification system for sorghums that was developed at a regional sorghum and millet workshop held in Nairobi in 1979 (Vogel and Graham, 1979). The classification system was developed by gathering a small group of experts for discussions focused

on food uses and preferences for sorghums. At an International Symposium on Sorghum Grain Quality in Hyderabad, India in 1981, forty-two papers were presented (Mertin, 1981), indicating the amount of current laboratory, field and survey research on consumption qualities of sorghums.

Although the amount of biological research on the processing and sensory characteristics of crops such as sorghum has increased dramatically over the past 25 years, a comprehensive methodology for determining the "consumer acceptance of crop cultivars" has yet to be established and validated. This opinion is based upon the observation that reports of national and international scientists engaged in research on the consumer acceptance of crops, contain a variety of unrelated theoretical concepts (Yaciuk and Yaciuk, 1983; Ngarmsak and Earle, 1982b; Boling and Eisener, 1981; Ejeta, 1981; Futrell and McCulloch, 1981; Murty and Subramanian, 1981; Novellie, 1981; Scheuring et al., 1981; Von Oppen and Rao, 1981; Badi et al., 1980; Eisener and MacFarlane, 1977; Vogel, 1976; Dovlo, 1975; Steckle and Ewanyk, 1974; Williams, 1974). Among the international studies cited above, measurements of attitudes about sensory, functional, compositional, socio-psychological and economic attributes of a crop are reported. Attitudes about the consequences of using a crop are also mentioned. Finally, past crop-related behavior is also reported as an indicator for the concept of consumer preference or acceptance of crops. Because diverse concepts and methods are reported in research on the consumer acceptance and preference for crops it is difficult to draw conclusions from the literature.

It is also difficult to draw conclusions from the research because the validity of measurement practices is frequently not determined or reported. Research findings are affected by the reliability and validity of sampling, data collection and methods of analysis. In research based on an interview or survey method these problems become confounded by cross-cultural factors. Because many developing countries are comprised of groups of people with different first languages, language-based bias can be a major validity problem. To overcome validity problems which result from language differences as well as from unrelated theoretical concepts and unreliable measurement practices, the following research was initiated in Canada. The objectives, literature review, methods, results and conclusions from the research are discussed in the following chapters.

CHAPTER II

OBJECTIVES

The overall objective of the research was to develop and evaluate a methodology for determining consumer acceptance of new or modified crop varieties in developing countries. More specifically, for a given population, the objectives were to develop a methodology for determining:

a. the crop varieties which are consumed by the target population,

b. the segments of the population which consume the crop,

c. the conditions for consuming the crop, and

d. the characteristics of the crop (evaluative beliefs) which are of greatest importance to consumers.

CHAPTER III

LITERATURE REVIEW

1. Introduction

The literature was reviewed to determine the concepts and practices used to measure consumer acceptance of food crops. In this review abstracts of the Nutrition, Food Science, Business, Sociology, Psychology, World Agricultural Economics and Rural Sociology, and Biological and Agricultural literature were surveyed. Literature published in research journals and books contained articles about food selection research and descriptions of practices for measuring food-related attitudes, intentions and consumption behavior. This literature also contained studies of the relationship between external factors such as socio-economic status and food attitudes and behavior.

2. Food Selection

Keywords in the abstracts, which related to the concept of food selection included food preferences, acceptance, purchasing behavior and consumption patterns. Food-related attitudes (e.g. beliefs and feelings) were also mentioned. Attitudes about the future use of food were called intentions in this literature. Different stimuli for representing food were used in the studies that were surveyed. For example, many researchers reported preference in terms of an attitude or intention about a food that was named or a food-related statement

(Wyant and Meiselman, 1984; Fjeld et al., 1983; Hertzler, 1983a; James and Buescher, 1983; Martens et al., 1983; Pliner, 1983; Ritchey and Olson, 1983; Cardello and Maller, 1982; McCracken, 198[illegible] Sanjur, 1982; Foxall, 1980; Wierenga, 1980; Birch, 1980, 1979; Amerine et al., 1965; Pilgrim, 1961). Other researchers reported preference in terms of an attitude and intention about a food that was tasted (Hertzler, 1983a; James and Buescher, 1983; Birch, 1980, 1979; Amerine et al., 1965). Attitudes and intentions about a tasted food were also used as a measure of food acceptance rather than preference (Griffin et al., 1985; Ross et al., 1985; Hertzler, 1983a; Brittin et al., 1982; Sanjur, 1982; Eppright, 1947).

In contrast to the reports of food preference and acceptance, Cardello and Maller (1982) noted that food consumption was consistently reported in terms of behavior rather than an attitude. Analysis of methods for measuring food consumption which were reported in selected literature supports Cardello and Maller's observation that food consumption is a behavior rather than an attitude (Hertzler, 1983a; Sanjur, 1982; NRC, 1981; FAO, 1977a; Pilgrim, 1961). Sanjur (1982) for example includes the behaviors of selecting, purchasing and ingesting food in the concept of consumption.

Cardello and Maller (1983) reviewed the validity of using measures of food acceptance and preference to predict food consumption. They defined food acceptance as the expressed like or dislike for a prepared sample of food. Food preference was defined as the expressed like or dislike reported in response to a named food. In most of the studies reviewed by Cardello and Maller (1983), food preference explained 25 to

66% of the variation in food consumption. A better correlation, r=0.81 to 0.92, was obtained between measures of food acceptance and food consumption.

In the literature on food selection, various definitions for the concept of "food" are used. Attitudes about "nutrition in general" were measured by Beavers et al. (1983), Perron and Endres (1983) and Byrd-Bredbenner and Shear (1982). Attitudes and consumption practices associated with "specific" ready-to-eat foods were measured by Rozin et al. (1984), Schumilas et al. (1984), Fjeld et al. (1983), Pliner (1983), Ritchey and Olson (1983), Wierenga (1980) and others. Other researchers measured attitudes that were associated with "general categories" of ready-to-eat foods such as vegetables (Axelson et al., 1983; Hertzler, 1983a; Cardello and Maller, 1982; Foxall, 1980).

All of the studies related to food selection in this literature review were conducted in developed countries. The studies were conducted on ready-to-eat foods rather than crops or ingredients for ready-to-eat foods. Concepts and methods related to consumer attitudes, intentions and behaviors for crops in developed and developing countries were not found in this survey of the literature.

3. Measurement of Food Attitudes and Intentions

Attitudes toward an individual food or a category of foods are reported in the literature. Attitudes about the overall attributes of a food or a specific attribute of food, such as color, are also mentioned in the literature. For example, attitudes about the overall attributes

of individual foods were measured by Pliner (1983). Attitudes specifically about the taste and nutritional quality of "food served in fast food restaurants" were measured by Axelson et al. (1983).

Words, pictures and actual samples have been used as stimuli to represent food. The name of a food was used in the studies by Wyant et al. (1984), Hertzler (1983a), Ritchey and Olson (1983), Wierenga (1980), Rudell (1979), Pilgrim (1961). Ritchey and Olson (1983) also showed pictures of foods to children to obtain their attitudes. Other researchers have presented actual samples of food to respondents as a method for obtaining attitudes to a food (Cardello and Maller, 1983, 1982; Dreher et al., 1983; Heintz and Kader, 1983; Martens et al., 1983). In these studies the food was either viewed or tasted.

Attitudes about sensory, functional, compositional, economic and socio-psychological attributes of food or consequences of food-related action were reported in the literature. For example, attitudes about sensory attributes including taste, appearance, color and texture were measured by Dreher et al. (1983), James and Buescher (1983), and Cardello and Maller (1982). These attitudes were measured using untrained panels of employees or consumers. The panels ranged in size from 36 to 315 members. Axelson et al. (1983) measured attitudes about the quality, caloric content, cost and availability of foods. They also measured attitudes about the cooking requirements of fast foods. Foxall (1980) measured whether or not a food is liked by children. He also measured intentions such as whether or not a food would be served to guests.

Scales used to measure food attitudes are described by Cardello and Maller (1983), IFT (1982), Sanjur (1982), and Larmond (1977). Cardello and Maller (1983) make a distinction between hedonic and frequency ratings. Hedonic ratings measure a respondent's degree of like/dislike for a food. Frequency ratings measure future intentions about the likelihood or expected frequency of performing a food-related action (eg. purchasing or serving a food to family members). The food action scales, mentioned by the Sensory Evaluation Division of the Institute of Food Technologists (IFT, 1981) are thus a frequency rating. Ranking and paired-comparison methods are described by Sanjur (1982) and Larmond (1977). In all of these studies, attitudes to a food itself or the consequences of using a food (a food-related action) were measured. All of these studies were conducted in developed countries.

Measurements of consumer attitudes to crops were not found in the literature on food attitudes. Because crops are generally not a ready-to-eat product, the methods used to measure attitudes to and intentions for using a food cannot be simply adapted to measure attitudes to crops. A method that involves tasting, for example, is inappropriate because crops usually must be processed before they can be consumed. Since crops can be processed in several ways, a specific process and product must be selected before a crop can be "tasted". If a food is not specified when a crop is mentioned, the researcher has no control over the context in which the attitude is measured. Differences in the attitudes respondents have to a crop can thus be caused by differences in the processing methods and products respondents are thinking of when they express their attitude to the crop.

4. Measurement of Food Behavior (eg. Food Consumption)

Methods of measuring food behaviors of respondents have been described by Fehily (1983), Cardello and Maller (1983), Sanjur (1982); NRC (1981) and the FAO (1981, 1979, 1977b). In this literature, food consumption behaviors are reported in terms of food disappearance, food expenditures and food intakes. Measures of food disappearance and food purchases are indirect methods for measuring food consumption. Food consumption is measured directly by recall, diary and weighing methods in studies conducted in developed and developing countries (FAO, 1981, 1979, 1977b). A recall method, called an interactive dietary assessment method, was designed and evaluated for use in developing countries by Rizvi et al., 1984 and Zeitlin et al. 1984.

Because crop consumption may involve the consumption of many different foods, rather than one specific food, methods used to measure food consumption can not be directly adopted to measure the consumption of crops. Although food disappearance studies include measures of the disappearance of crops, they do not focus on the foods made from the crops. Food intake studies such as those described by Young (1981) relate mainly to ready-to-eat products and do not focus on crop cultivars which were used to prepare the products.

5. External Factors and Food-Related Attitudes, Intentions and Behaviors

In addition to measuring food attitudes and intentions, various researchers in developed countries have related external variables, such as the socio-economic and demographic attributes of consumers, to food attitudes and behavior. Age, gender, regionality and use of competitive brands (products) have been used to predict food attitudes and behaviors (Churchill, 1983; Fishken, 1983; Boyd, 1981; IFT, 1981; Rudell, 1979; Amerine et al., 1965). A secondary analysis of the 1977-78 Nationwide Food Consumption Survey in the United States indicated correlations of age, race and region with consumption of some, but not other, food groups (Cronin et al. 1982). From a range of emographic variables, Coleman (1982) observed that only health-related dietary restrictions influenced attitudes about the acceptability of a variety of foods. Education level, household income, work status of respondent and "stage in family life cycle" were related to the acceptability of only three or less of the foods included in the study.

Relationships between culture, food attitudes and behavior have been mentioned by many researchers (Bull and Barber, 1984; Carlson et al., 1983; Dewey et al., 1984; Wharton et al., 1984; Desai et al., 1983; McCracken, 1982; Anderson and Alleyne, 1979; and Hunt, 1977). It is well-documented that when people from one culture migrate to another culture the food attitudes and behaviors of subsequent generations change (Dewey et al., 1984; Freedmen and Grivetti, 1984; Nguyen et al., 1983; Campbell and Lowen, 1981). In all of these studies, only ready-

to-eat foods or categories of food (eg. the four food groups) were discussed. The effect of external variables on consumer attitudes and behaviors that are associated with crops in developed countries were not reported in the literature.

Literature from developing countries also mentioned food consumption behavior and external variables. The informal observations of Price (1984) were that dietary practices in India are primarily influenced by income, geographic region and type of community in which a person lives (urban/rural) rather than religion. The findings of Pushpamma et al. (1981) were that pulse behaviors of consumers in Andhra Pradesh, South India are related to pulse species. Studies of consumer attitudes to crops or the relationships between attitudes to crops, behavior with crops and external variables in developing countries were not found in the literature.

6. Summary

In the literature reviewed for this study no theories of the consumer acceptance of crops were presented either for studies in developing or in developed countries. Methods for direct measurement of crop-related behavior, such as the consumption of specific foods which were prepared from a crop, were also not described in the literature. Methods for indirect measurement of crop consumption (eg. disappearance of crops and household expenditures on crops) however, were reported in studies conducted in both developed and developing countries. Although the relationship between external factors, consumption and consumer attitudes about ready-to-eat foods or food groups has been examined for

consumers in developed countries, the findings have generally been inconclusive. No single demographic variable or group of demographic variables has been consistently linked to consumer attitudes and consumption of different foods or crops.

As indicated in Chapter I, research on the acceptability of processed and sensory characteristics of crops, as well as the consumer acceptance of crops, is being conducted at international and national agricultural research stations in the developing world. The absence of published reports in the literature reviewed for this study suggests that the opportunities for peer review and critical assessment of such research are limited. It also suggests that research on the development of methodologies for determining the consumer acceptance of crops is either relatively new or simply not being done.

Because theories and methods for measuring consumer acceptance of crops are not published in the literature, it was decided that the present research study would be enhanced by a content analysis of some international studies on the consumer acceptance of crops. A content analysis of seventeen international studies and a proposed methodology for measuring the consumer acceptance of crops, which was developed from the findings of the content analysis, are discussed in the next chapter.

CHAPTER IV

DEVELOPMENT OF METHODOLOGY

1. Introduction

The development of a methodology for determining the consumer acceptance of crops in a developing country required a number of assumptions about the appropriateness of applying theoretical concepts and methods across countries and across cultures. This research is based on the assumptions that:

a. theoretical concepts are stated in general terms which often are not restricted to a specific time or space (Nagel, 1965), and

b. measurement practices are implemented in a specific context and are by deductive reasoning, related to underlying theoretical concepts (Wallace, 1974; Blalock, 1968).

In this research, the first assumption is the justification for applying theoretical concepts that underlie research in North America to research in developing countries. The second assumption is the justification for relating methods used in developing countries to theoretical concepts that underlie research in North America. On a practical level these assumptions were made because a preliminary content analysis of seventeen international studies indicated that researchers who conducted these studies did not explicitly state concepts or theories underlying their research. The content analysis also indicated that the methods described in the studies were measuring concepts such as attitudes to crops and behavior with crops.

For this research, definitions of crop acceptance, preference and consumption were developed. Definitions for crop acceptance and crop preferences were developed from Cardello and Maller's (1983) definitions of food acceptance and preference. Cardello and Maller defined food acceptance and food preference as measures of the expressed like or dislike for a food. It is assumed that such measures represent respondents' feelings, beliefs or attitudes about food. In this research, crop acceptance was therefore defined as an attitude, belief or feeling that is measured by the respondent's response to the actual samples of a crop. Unlike food acceptance, crop acceptance does not involve tasting. Crop acceptance is based on a visual and tactile assessment of crops. Crop preference was defined as an attitude, belief or feeling that people report when the name of a crop, not the crop itself, is shown or mentioned to a person.

Crop consumption was defined as the whole set of behaviors for selecting, purchasing and ingesting a crop. This definition was derived from Sanjur's (1982) definition for food consumption. Because crops are generally not in a ready-to-eat form, crop consumption includes the ingestion of all ready-to-eat products which are normally prepared from them. Like food consumption, crop consumption was assumed to be more highly correlated to measures of acceptance than preference. For this research crop acceptance was therefore measured.

2. Content Analysis of 17 International Studies

2.1 Purpose of Content Analysis

The content of seventeen international studies was analyzed to identify concepts and methods which researchers in developing countries have used for research on the consumer acceptance of crops. A second purpose of the content analysis was to identify concepts and methods for inclusion in the methodology being developed for this research.

2.2 Selection of International Studies

Seventeen reports of international studies on attitudes and behaviors of consumers to crop cultivars that were obtained previously by the researcher during on-site visits to national and international food and agriculture research institutions were used for the content analysis study. The studies were conducted in Africa and Asia by researchers who were working through regional, national or international institutions (see Appendix 1). Attitudes about pulses and cereals were measured in these studies. The primary researchers held college or postgraduate degrees in disciplines such as home economics, food science, nutrition, economics and plant science. These studies were selected because they contained research that was conducted on a range of crops in various developing countries. The researcher was also familiar with the national and institutional context of the research. The studies were thus selected by a purposive sampling procedure.

2.3 Development of Method for Analyzing the Content of 17 International Studies

2.3.1 Theoretical Framework for Content Analysis

As concepts were not mentioned in any of the 17 studies, deductive reasoning was used to identify concepts underlying the methods described in the studies. In order to develop categories for analyzing the concepts, theories on food selection were reviewed in the North American literature (Cardello et al., 1985; Dennis and Shifflet, 1985; Meiselman, 1984; Barker, 1982; Hertzler, 1983a, 1983b; Sanjur, 1982; Olson and Gillespie, 1981; Grivetti and Pangborn, 1973; Eppright, 1947). This review indicated that no single theory of food selection was widely adopted or empirically tested in North America. No empirical studies which compared the validity of the range of theories on food selection were found in the literature. There was thus no basis for developing a concise list of concepts underlying food selection research.

As foods prepared from crops are consumer goods, it follows that theories about consumer behavior should be appropriate to this research. Theories of consumer behavior were therefore reviewed to develop a list of categories for concepts. It was noted that theories of consumer behavior do not focus upon physiological reasons for food choices. Because the nutritive value of varieties within, as opposed to between, crop species is relatively constant, physiological factors do not significantly influence choices between varieties of the same crop. Therefore the absence of physiological factors in consumer behavior theories does not limit the application of consumer behavior theor

this research.

Two comprehensive models of consumer decision processes were summarized by Engel and Blackwell (1982). These models will be referred to as the high- and low-involvement EKB (Engel, Kollat and Blackwell) models. The high-involvement EKB model is based on a rational decision process; while the low-involvement EKB model is based on the decision process being the result of chance or impulsive factors which appeal to consumer's unconscious motives. Both models include an information processing and decision process. Because national and international development and agricultural extension programs are based on the assumption that agricultural development is the result of an empirical or scientific and a rational or reasoned process (Bennis et al., 1969), the high-involvement EKB model is considered appropriate to this research.

The decision process in the high-involvement EKB model is divided into several sections. The Alternative Evaluation section of the model depicts the relationship between beliefs, attitudes, intentions and behavior (action-related choices). Because the problem of developing a methodology to determine consumer acceptance of crops relates to the process of Alternative Evaluation, this portion of the EKB high-involvement model is considered most relevant to this research. The Alternative Evaluation section of the model is based upon the theory of Reasoned Action (Engel and Blackwell, 1982). The theory of Reasoned Action has been described in detail by Ajzen and Fishbein (1980). A description, diagram and summaries of the requirements for and

limitations of the theory are given in Appendix 2. In addition to being compatible with the rational and scientific basis of agricultural development programs, the Ajzen and Fishbein theory is also succinct and it can be empirically tested. The theory has also been used in studies of the relationship between food attitudes and behavior (Axelson et al., 1986, 1983; Ajzen and Fishbein, 1980). Because Ajzen and Fishbein recommended that, whenever possible, attitudes should be measured by directly exposing respondents to the actual product (object of the behavior) the procedure of measuring crop acceptance by showing respondents samples of a crop was appropriate to this theory.

2.3.2 Categories for Analyzing Concepts of the 17 International Studies

A preliminary screening of the international studies indicated that methods did not meet requirements for applying the theory of Reasoned Action (see Appendix 2). Methods reported were not consistently associated with crops and crop-related actions. Attitudes and behaviors being measured were not always obtained from direct exposure to samples of the crops. Behavioral elements, including target, action, context and time conditions, defined by Ajzen and Fishbein (1980), were not mentioned in the methods described in the international studies. Broader definitions were therefore used to develop an attitude and behavior category for analyzing concepts underlying measures in the international studies.

An attitude was defined as a belief or feeling related to a crop or food. Beliefs or feelings related to the future use of a crop or food

were included in the attitude category for this content analysis study. A separate category for intentions was not developed because distinctions were not made between general attitudes for a crop and attitudes for the likelihood of using a crop in the future. Beliefs about objects, beliefs about object-related actions and normative beliefs were also classified as attitudes for the content analysis even though these concepts are distinct, according to Ajzen and Fishbein (1980). A category for analyzing the behaviors measured in the international studies was defined as including past and present actions that could be observed. In this definition, behavior includes habits and ways for consuming a crop or food.

Categories were developed to analyze differences in the Exposure Stimuli used to measure an attitude or behavior (see Table 1) and the Conditions that were specified in measures of an attitude or behavior (see Table 2). These categories were developed to analyze the concepts used in the studies, according to the limitations placed by Ajzen and Fishbein (1980) on the theory of Reasoned Action (see Appendix 2). Literature on the influence of stimuli on the process of memory recall was also used to develop these categories (Engel and Blackwell, 1982; Purdy and Luepnitz, 1982; Sanjur, 1982; Ajzen and Fishbein, 1980; Pavio and Csapo, 1973). The Unit category in Table 1 was developed from observations that attitudes can be measured on specific or general foods (Cardello and Maller, 1983; Sanjur, 1982; NRC, 1981). The Situation category (see Table 1) was created from Ajzen and Fishbein's (1980) distinction between attitudes for objects and object-related action.

Table 1: Categories and Classes for Analyzing Exposure Stimuli Used to Measure Attitudes in 17 International Studies

Category	Class
Unit	specific (e.g. crop/food name), category (e.g. crop/food group)
Situation	object evaluated (e.g. crop, food), object-related action evaluated (e.g. crop or food-related action)
Cue Form	word, picture, model, sample
Cue Involvement	hear, read, see, taste, use

Table 2: Categories and Classes for Analyzing Conditions that were Specified in Measures of an Attitude or Behavior in 17 International Studies

Category	Class
Target	raw crop, semi-processed crop (e.g. ingredient), ready-to-eat product (e.g. food)
Action	e.g. use, use to prepare a specified product, buy
Time	e.g. within next week, month, year
Context	where (at home), with whom (family: household member, e.g. parents, children; others: e.g. guest, friend), why (meal, snack)

The Cue Form and Cue Involvement categories were incorporated from a review of the measurement practices described by Cardello and Maller (1983), Sanjur (1982), and Hutchings (1977).

The classes for Conditions (see Table 2) were taken from Ajzen and Fishbein's (1980) discussion of conditions influencing correlations between measures of attitude and behavior. Classes for the Context category were developed from a review of measurement practices mentioned by various researchers (Churchill, 1983; Engel and Blackwell, 1982; Dickinson, 1982; Boyd et al., 1981; NRC, 1981; FAO, 1981, 1979, 1977b).

2.3.3 Categories for Analyzing Methods of the 17 International Studies

Categories for analyzing methods used in the studies were developed by reviewing the measurement and validation methods used by home economists, marketing researchers and sociologists in developed countries (Babbie, 1983; Churchill, 1983; Axelson and Csernus, 1983; Bohrnstedt and Kneke, 1982; IFT, 1981; Bell et al., 1981; Boyd et al., 1981; NRC, 1981; FAO, 1981, 1979, 1977b; Mitchell and Mitchell, 1980; Cuthbert, 1979; Henry, 1979; Sudman and Ferber, 1979; Compton and Hall, 1972). Literature on the constraints of research in developing countries was also reviewed (Matlon et al., 1984; Banta, 1982; Cross, 1981; Davis et al., 1981; Jansen et al., 1981; Novellie, 1981; Kaynak, 1978). The categories of research methods listed in Table 3 were developed from this review.

The classes for Type of research were taken from Compton and Hall (1972), because their scheme was sufficiently broad and distinct to fit

Table 3: Categories and Classes for Analyzing Methods in 17 International Studies

Category	Class
Type (of research)	interview, other (e.g. documentary, field or laboratory experiment, self-administered survey, secondary analysis, field research)
Purpose (of research)	exploratory, descriptive, explanatory
Source of Selected Evaluative Beliefs or Behavior	researcher, consumers (open-ended survey questions, focus groups, Repertory Grid Technique)
Statement of the Problem	information cited* (consumer groups, crop varieties, crop usage), information source (e.g. literature, observe practice, interview, scales/tests), validity
Sample	unit (individual: e.g. person; aggregate: e.g. household, school), size, frame, selection method (probability; non-probability)
Data Collection Forms**	type, length, content, pretesting method
Method for Collecting Data**	time (e.g. of day, week, year), duration (e.g. minutes), location, situation, interviewers/ technicians, other researchers
Analysis of Data**	consumer groups compared, frequency, central tendency, reliability, validity, significance, statistical tests, errors
Resource Constraints	materials, human

* Further classes for the Information Cited (Statement of the Problem) are given in Table 4.

** Other classes for the Data Collection Forms, Methods for Collecting Data and Analysis of Data categories are listed in Tables 5-10.

the range of studies to be analyzed. The IFT and marketing classifications for research types were considered inappropriate for the methods used in the international studies (Churchill, 1983; IFT, 1981; Boyd et al., 1981). Thus Documentary, Experimental (laboratory and field), Survey and Field Research classes were selected instead of the IFT (Analytical versus Affective) and marketing (Exploratory versus Conclusive) classes of research (see Table 3). Babbie's (1983) classes of the Purpose of research were used to analyze the content of the studies (see Table 3).

Methods used to select the characteristics of a product that consumers are asked to evaluate were reviewed to develop classes for the category: Source of Selected Evaluative Belief or Behavior (Zeitlan et al., 1984; Boyd et al., 1981; Ajzen and Fishbein, 1980; Martin, 1976; Okonji, 1971; Summers, 1970; Frost and Braine, 1967). In these methods the source of an evaluative belief or behavior was either developed by the researchers or derived from consumers. Open-ended survey questions, focus groups and Repertory Grid Techniques were used to identify evaluative beliefs from consumers. In the content analysis study, an evaluative belief was defined as a belief that a person uses to evaluate or give meaning to a product. Such beliefs are similar to the constructs mentioned by Frost and Braine (1967).

Classes for the Statement of the Problem were developed from literature by Babbie (1983), Bohrnstedt and Knoke (1982), Cuthbert (1979), Study Group on Nigerian Grain Processing (1978), Henry (1979) and Compton and Hall (1972) (see Table 3). Additional classes for

Information Cited were developed to distinguish between qualitative and quantitative information about kinds and numbers of consumers, crops and patterns of crop use (see Table 4). Classes for the Sample category were developed from a review of sampling methods discussed by Babbie (1983), Churchill (1983), Bohrnstedt and Knoke (1982), Boyd et al., (1981), FAO (1981, 1979, 1977b), Mitchell and Mitchell (1980) and Compton and Hall (1972) (see Table 3).

Various aspects of research design were described by Babbie (1983), Churchill (1983), Assael and Keon (1982), Bohrnstedt and Knoke (1982), Hunt et al. (1982), Boyd et al., (1981), FAO (1981, 1979, 1977b), Compton and Hall (1972) and Morse (1951). These descriptions were used to develop classes for the Data Collection Forms, Methods for Collecting Data and Analysis of Data categories (see Tables 5-10). Compton and Hall's (1972) classes for types of measurement methods were used to develop classes for the Type of data collection forms that were described in the studies (see Table 5). A method for classifying the Content included on the data collection forms was developed by reviewing measures for attitudes, behavior and other consumer attributes that were mentioned by Land and Shepherd (1984), Barker (1982), Hertzler (1982a), Moore (1982), Sanjur (1982), Olson and Gillespie (1981), Ajzen and Fishbein (1980), FAO (1981, 1979, 1977b) and Cuthbert (1979) (see Tables 5-8). Findings from studies cited in the review of the literature were also used to develop classes for analyzing the Content of the forms that were used to collect data.

Several authors have highlighted constraints on research in developing countries (Matlon et al., 1984; Banta, 1982; Cross, 1981;

Table 4: Additional Classes for Analyzing Information Cited in 17 International Studies (see Statement of the Problem Category Table 3)

Class	Additional Classes
Consumer Groups	kinds (socio-economic, demographic, usage), relative size
Crop Varieties	kinds, source (local, imported), amounts
Crop Usage	processes used on crop (kinds, relative importance), ingredients made from the crop (kinds, relative quantities) products made from the crop (kinds, relative quantities)

Table 5: Additional Classes for Analyzing Data Collection Forms in the 17 International Studies

Class	Additional Classes
Type	questionnaire/interview objective scales/tests
Length	number of items or pages
Content*	language used on form, attitudes (evaluative beliefs, unit, measurement level, question type, scale type)
	behavior (type, unit, measurement level, measurement technique)
	other consumer attributes (socio-economic, demographic)
Pretesting Method	respondents (number, range of skills/language)
	interviewers (number, range of skills/language)
	methods (observe, probe, multi-method)

* Additional classes for Content related to the Attitudes, Behavior and Other Consumer Attribute Classes are listed in Tables 6-8.

Table 6: Additional Classes for Analyzing Content of Data Collection Forms Related to the Attitudes Measured in 17 International Studies (see Table 5)

Class	Additional Classes
Evaluative Beliefs	sensory/aesthetic, functional (e.g. convenience, utility, skill), compositional (e.g. health, nutrients), socio-psychological (e.g. familiarity/ security/membership, serve to guests/status attainment), economy (e.g. time, money, effort)
Unit	overall attitude, attitudes about individual attributes of the crop/food
Measurement Level	kinds of attitudes, strength of attitudes
Question Type	open, yes/no, multiple choice
Scale Type	rating (hedonic, intended frequency, intended amount, other), ranking, paired comparison, other (e.g. semantic differential)

Table 7: Additional Classes for Analyzing Content of Data Collection Forms Related to Behavior Measured in 17 International Studies (see Table 5)

Class	Additional Classes
Type	crops varieties used, processed, ingredients used, products used
Unit	crop category, crop cultivar
Measurement Level	kinds, frequency, amount
Measurement Techniques	recall (of past), diary (recorded purchases), disappearance, weighed intake

Table 8: Additional Classes for Analyzing Content of Data Collection Forms Related to Other Consumer Attributes Measured in 17 International Studies (see Table 5)

Class	Additional Classes
Socio-economic	education, occupation, income
Demographic	geographic (e.g. climate, region), residence (urban/rural), age, gender, ethnicity, first language, religion, family (stage, structure, lifecycle, household size)

Table 9: Additional Classes for Analyzing Methods for Collecting Data in 17 International Studies (see Table 3)

Class	Additional Classes
Location	home, market, laboratory
Situation	group, personal
Interviewers/ Technicians	attributes (e.g. experience, residence, age, gender, education, religion, first language, occupation), training, supervision
Other Researchers	attributes (e.g. residence, first language)

Table 10: Additional Classes for Analyzing Methods for Analysis of Data in 17 International Studies (see Table 3)

Class	Additional Classes
Consumer Groups Compared	demographic, socio-economic, behavior/product usage (kinds, amounts, frequency) attitudes (kinds, strength)
Frequency	e.g. percentage/proportion
Central Tendency	e.g. mean, mode
Reliability	e.g. over time, samples, researchers
Statistical Tests	e.g. chi-squared, Anova, crosstabular, regression (linear, multiple), correlations
Errors	sampling, nonsampling (non-response, bias)

Davis et al., 1981; FAO, 1981, 1979, 1977); Hartog 1981; Jansen et al., 1981; Moir 1980; Schoffield, 1979; Kaynak, 1978). A Material and Human class was developed for the category of Resource Constraints.

2.3.4 Pretest of Categories for Analysis of the 17 International Studies

The categories for analyzing the studies were pretested by analyzing four studies which represented a variety of concepts and methods. Experiences from the pretest were used to develop the form for categorizing the studies (see Appendix 3). If Concepts and Methods were not mentioned in a study, this was recorded. When the Concepts or Methods did not fit into the classification specified, they were placed into the Other class and explanatory notes were added to describe the concept or method that was mentioned in the study.

2.3.5 Methods for Analysis of the 17 International Studies

The content of each study was individually recorded onto the form shown in Appendix 3. Results were tabulated to determine the number of studies in which each class of concepts and methods was used. The North American literature was reviewed to locate cross-cultural studies which had been done in developed countries. Concepts and methods used in these studies were compared with those in the international studies. Classes of concepts and methods used in at least one study were considered to be feasible if they were used in cross-cultural research that was reported in North American literature. The category of

concepts and methods used to classify most of the international studies was considered to be the mode category, and to be the concept or method familiar to researchers in developing countries.

Concepts and methods that were classified as feasible, that satisfied the limitations for the theory of Reasoned Action and that were compatible with the definition of crop acceptance were selected for the methodology for this research..

Reliability of the content analysis was determined by re-analyzing five of the studies two weeks after the initial analysis was completed. The studies for re-analysis were selected at random and the same researcher analyzed these studies. The extent to which the 17 international studies that were selected for the content analysis are representative of current research on the consumer acceptance of crops was assessed by obtaining descriptions of 4 other studies of the consumer acceptance of crops which were conducted between 1984-1985 (Dessert, 1985; Haugerud, 1985; Due et al., 1985; Watts et al., 1984).

3. Results and Discussion of Content Analysis

3.1 Reliability and Validity of Content Analysis

There was good agreement between the original and repeated analysis of the five international studies, 91% of the classifications remained the same. The method used to classify the studies was therefore considered to be reliable.

Since the categories and classes for analyzing the studies were developed from a range of widely accepted references, the categories and

classes that were selected were considered to be valid. The content of the 17 international studies and that of the four additional studies that were done between 1984-1985, was similar. A theoretical framework was not used in the four studies. The four studies included only one method, the use of a focus group, that was not used in the 17 studies in the content analysis. Background studies that would focus a questionnaire-based survey on specific crops, consumers, conditions and evaluative beliefs were not mentioned in any of the content analysis or more recent studies. The overall findings of the content analysis were considered to be representative of research on the consumer acceptance of crops that is done in developing countries.

3.2 Results of Content Analysis

An economic theory was mentioned in one study (Von Oppen & Rao, 1981). No other theories were mentioned in the remaining 16 studies. Attitudinal and behavioral concepts were measured in 13 and 11 of the studies, respectively. Summaries of the remaining classifications of the 17 studies are listed in Appendices 4-11.

3.3 Discussion of Theories and Concepts Used in the 17 International Studies

Theories about consumer acceptance of crops did not appear to be familiar to the researchers who did these studies. Because attitudinal and behavioral concepts were used in the majority of the 17 studies, it was considered appropriate to base a methodology for measuring the consumer acceptance of crops on a theory that includes both of these

concepts. The theory of Reasoned Action was selected as the basis for this research because it includes both attitudinal and behavioral concepts. This theory has been used in studies on food acceptance (Axelson et al., 1983).

Respondents were not shown pictures or asked to read the names of crops. Classes of Exposure Stimuli shown in bold-faced print in Appendix 4 were selected for this research because they satisfied the requirements for applying the theory of Reasoned Action and the definition of crop acceptance. It was considered feasible to use all classes of Condition for using exposure stimuli in the methodology being developed for this research, as all classes were used in at least one of the international studies (see Appendix 5). Since all classes were developed from the requirements for the theory of Reasoned Action, it was considered appropriate to use any of the classes in the methodology being developed. The definition of crop acceptance requires the use of a raw crop for a specific product. For this reason, other classes of Target and Action were not selected for the methodology being developed.

It was feasible to select interviews, laboratory experiments and field research for the methodology being developed because these Types of research were used in the 17 studies (see Appendix 6). Since the theory of Reasoned Action is applied by conducting questionnaire-based interviews or surveys, only the interview method was considered appropriate for the methodology of this research. Marketing research involves a series of studies which have exploratory, descriptive and explanatory purposes (Churchill, 1983; Boyd, 1981). All three classes

of Purpose are thus appropriate and feasible for research on the consumer acceptance of crops in developing countries. For these reasons, all of the classes of Purpose were selected for the methodology being developed in this research.

Researchers in North America consider that it is more appropriate to have consumers identify evaluative beliefs (or constructs) than to have researchers do the identification (Coleman, 1982; Ajzen and Fishbein, 1980; McFadyen, 1972; Frost and Braine, 1967; Morse, 1951). Consumers were selected as the Source of Selected Evaluative Belief and Behavior for this reason (see Appendix 6). A focus group and Repertory Grid Technique have been used in international studies of marketing research to select evaluative beliefs from consumers rather than researchers alone (Albaum and Peterson, 1984; Shocker and Srinivasan, 1979). The Repertory Grid Technique for eliciting, recording and interpreting consumer responses may be easier to implement in a cross cultural context than focus group methods, since problems of translation and interpretation can be limited to a dialogue between two rather than 15-20 people. The Repertory Grid Technique for selecting evaluative beliefs and behaviors from consumers was thus selected for the methodology being developed.

3.4 Discussion of Methods Used in the 17 International Studies

Problem Statements listed in Appendix 7 included information about the kinds of consumers, crops and food products. Only a few studies mentioned information about the numbers of consumers, crops and food products in the Problem Statement. Researchers in North America have

indicated that background information should be used to focus questionnaire-based interviews for consumer acceptance on specific groups of consumers and products (Mitchell and Mitchell, 1980; Henry, 1979; Cuthbert, 1979). To apply the theory of Reasoned Action the conditions in which an action occurs must be specified. Because a crop may be used to prepare many different products, there may be many different types of consumer groups. To focus questionnaire-based interviews for the consumer acceptance of crops on dishes which many consumers frequently prepare, it is necessary to base statements of the research problem on information about the numbers of consumers who use different crops and products (dishes). It is also necessary to specify the conditions in which crops and products are used. All of the categories of information that were used in the international studies could therefore be selected for the methodology being developed in this research.

From the results summarized in Appendix 7 it is apparent that interviews were not used as a Source of Information about problems to be investigated. Interviews could have been used, however, to collect information in such studies. Compton and Hall (1972) indicated that information can be validated by cross-checking findings obtained from more than one source. All three of the possible Sources of Information were therefore selected for the methodology being developed. The consequence of the decision to focus a questionnaire-based survey on information from most classes of Information Cited and all of the Sources of Information included in Appendix 8 is that a series of

background studies have to be conducted as a part of the methodology being developed for this research. The purpose of the background studies therefore, is to describe the crops, consumers, conditions for using a crop and evaluative beliefs that will be the focus of the questionnaire-based survey.

The information given in Appendix 8 indicates that all of the categories of Samples were feasible for the methodology being developed. As stated by Yaciuk and Yaciuk (1983) and Kaynak (1978), it is appropriate to select a sample of respondents in developing countries from geographic clusters by a non-probability method. For these reasons a non-probability method of selecting respondents on a quota basis, that is related to the geographic origin of respondents, was selected for the methodology being developed in this research.

Semantic differentials were not used in any of the international studies as a method for measuring attitudes. North American researchers however have used semantic differentials in cross-cultural studies (Osgood, 1964, 1960). Since it was considered feasible to use semantic differentials for information gathering in developing countries, the use of semantic differentials was included in the methodology being developed in this research. The remaining classes of Data Collection listed in Appendix 9 were also considered to be feasible for research in developing countries. Since the methodology being developed for this research will include a series of background studies and a questionnaire-based survey, it was not appropriate to select classes of the Type of data collection form, to vary the Length of the forms, Language, Types of Attitude Measures, or Pretesting methods.

In the methodology being developed for this research the method of identifying evaluative beliefs or behavior from consumers has already been selected. Therefore it was not appropriate to make an a priori selection of the classes of Evaluative Beliefs or Behavior that would be included in the methodology. The classes in bold-faced print in Appendix 9 were included in the methodology being developed in this research, because they met the requirements for applying the theory of Reasoned Action and measuring crop acceptance.

The classes of Methods for Data Collection were only used to classify survey research that was reported in the international studies. As a result, these findings were only used to select classes for use in the questionnaire-based survey that was being developed as a part of the methodology for this research. Because the practice of personally interviewing respondents in their homes was used by many researchers in these international studies, it was selected for the methodology being developed (see Appendix 10).

All classes of methods for Analysis of Data listed in Appendix 11 were considered to be feasible for research in developing countries. Classes in bold-faced print were selected for the methodology being developed. Methods for analysis of data were used in 8 or more studies and were considered to be familiar to the researchers in these international studies. Although tests of reliability, validity, non-response errors and Pearson correlations were used in only two or less of the international studies, it is only with such methods of data analysis that researchers may comment on the validity of their findings.

For this reason these methods were also included in the methodology being developed for this research. Image Profiles were included as an alternative for presenting data because Coleman (1982) found this was an effective method for comparing several attitudes for several foods.

3.5 Summary and Conclusions of Content Analysis

The content of seventeen international studies purporting to measure the consumer acceptance of crops was analyzed to develop a list of concepts and methods which could be included in a methodology for determining the consumer acceptance of crops in developing countries. The findings of the content analysis supported the hypothesis that in reports of international studies on consumer acceptance of crops, it is uncommon that the theoretical basis or concepts underlying the research are mentioned. There is no evidence that a comprehensive and integrated group of methods, which can be systematically applied, exist for the study of the consumer acceptance of crops in developing countries. However, the findings do support the hypothesis that it is feasible to measure crop acceptance as defined in this chapter and to apply the theory of Reasoned Action to research on the consumer acceptance of crops in developing countries.

The categories of concepts and methods in bold-faced print in Appendices 4-11 were selected as being appropriate for the methodology being developed in this research, because they met the requirements of the theory of Reasoned Action, the definition for crop acceptance and they were used in at least one of the 17 international studies or in cross-cultural studies reported in North American literature. The

content analysis of information in statements of the research problem, indicated that a series of background studies are required to focus the research problem that is being addressed in a questionnaire-based survey on specific consumers, crops, conditions for using a crop and evaluative beliefs. The content analysis also indicated that semantic differentials for scaling responses and the Repertory Grid Technique which allows consumers to select evaluative beliefs that should be included in questionnaire-based surveys were not used in any of the 17 studies. Because both of these methods have been used in cross-cultural research, both methods were included in the list of concepts and methods that would be included in the methodology being developed. Image Profiles were included in the methodology to provide a graphic summary of the acceptance of crops.

4. Description of Methodology Proposed for Measuring the Consumer Acceptance of Crops in Developing Countries

4.1 Introduction

Yaciuk and Yaciuk (1983), Pushpamma et al., (1981), Dovlo (1975), and Steckle and Ewanyk (1974) conducted their research in several communities in different geographic areas of Senegal, India, Ghana and Nigeria. Their research was costly in terms of travel time, travel expenditures and ability to monitor effectively the quality of their research. Respondents who were interviewed in urban communities did not all speak the same language in these studies. Respondents who were interviewed in rural communities tended to speak a shared first

language. To reduce costs for research on the consumer acceptance of crops in developing countries, while increasing the opportunity to monitor closely and thus control such research, the methodology being developed in this research was designed to focus on a selected community in the country where the consumer acceptance research would be done. It was assumed that language and geographic place of birth were measures of culture. It was thus proposed that members of a generation which migrated to a selected community from selected geographic regions of the country where the consumer acceptance research was being done, be selected as the sampling frame for this methodology. This would make it possible to select people from different geographic clusters without incurring the high costs of doing research in several locations within a country.

The researcher's personal experiences with and knowledge about research environments in several developing countries was used as a basis for developing a list of seven background studies. The studies were based on concepts and methods, which were selected from the content analysis (see Appendix 12). The purpose of the seven studies was to collect information to focus the research problem of a questionnaire-based survey. Specific information that would be collected about crops in a selected category of crops, consumers of those crops, conditions for consuming the crops and evaluative beliefs consumers associate with the use of these crops is listed in Appendix 13. The purpose of the questionnaire-based survey was to use the method of showing respondents actual samples of a crop to measure crop

acceptance. A second purpose of the questionnaire-based survey was to use the theory of Reasoned Action as a basis for relating crop acceptance to crop consumption.

It was considered that interviews with people who are engaged in different stages of the postproduction system (PPS) for a crop may have different information about the crop. The postproduction system was defined as including all activities between the harvesting and ingestion of a crop (Forrest et al., 1979). The seven background studies include interviews with people who are engaged in various stages of the PPS. Information which is collected in more than one of the background studies, from persons associated with different stages of the PPS about the topics in Appendix 13 can therefore, be compared to judge the validity of the information.

The methods proposed for each of the 8 studies are described in general terms in the remainder of this chapter. The methods may be applied by selecting a specific community, category of crops, crop cultivar and geographic regions to be represented within the sampling frame.

4.2 Study 1: Methods Proposed for Literature Review

Information will be obtained from research journals and from university, government, non-profit private and international organizations in the country where the questionnaire-based survey will be conducted. Materials which have been published by these organizations will be identified by interviewing employees such as home economists, nutritionists, food researchers, health researchers and

agriculturalists. A separate form will be used to record information about crops, consumers, conditions and evaluative beliefs (see Appendix 13).

To analyze the findings, comparisons will be made of information on the same topic obtained from different sources. If information from all sources is similar (consistent or in agreement), it will be accepted as valid. If discrepancies can be explained, the information will also be accepted as valid. If discrepancies can not be explained, no conclusions will be [illegible] the validity of the information.

4.3 Study 2: Methods Proposed for Informal Interviews with Public Officials

Public officials, in the country where the study is conducted, will be contacted. Officials responsible for agricultural development [illegible] for the organization of formal or informal associations comprised of people representing different geographic and language groups will be interviewed. Public officials responsible for the breeding, marketing and processing of crops will be identified by directors of the national agencies or from the directories of such agencies. Chiefs or other senior officials responsible for the organization and support of associations which have members that are responsible for preparing most of the food that is eaten in homes such as national women's, farmer's, community development or political associations will be identified in the same manner. The overall purpose of the crop acceptance research will be explained and officials willing to cooperate in the study will

be interviewed. The questions that will be raised during the interviews with public officials are summarized in Appendix 14. The interviews will be conducted by a researcher from the country where the study is conducted. This researcher should have a knowledge of the foods, crops and consumers in the country.

Informal notes will be taken during the interview. These notes will be transcribed into a more detailed account immediately following the interview. The validity of information from the transcribed summary of each interview will be analyzed by the methods used in Study 1.

Findings from Studies 1 and 2 will be used to determine the cultural (eg. geographic place of birth, language) characteristics of people who have different usage patterns for crops included in the general category that contains the selected crop (eg. the crop which will be studied in the questionnaire-based survey). These characteristics, and population statistics related to them, will be used to select a community where the remaining background studies and the questionnaire-based survey will be conducted. Opinions of public officials responsible for formal or informal associations will be used to develop a list of associations which include members that have migrated to the selected community from other regions of the country. Leaders of associations in the selected community will be interviewed to identify associations with members who are responsible for preparing most of the food that is eaten at home, who speak languages used in other regions of the country and who have migrated to the community from other regions of the country.

4.4 Study 3: Methods Proposed for Observations and Informal Interviews in Markets

Observations will be made in the marketplace to identify which cultivars of the selected crop are available in the country and which crops in the selected category of crops are available. If possible, the observations will be made shortly after the harvest season for the selected crop to ensure that the crop is available. Depending upon the country where the study will be done, the marketplace should include open-air markets and retail stores. If possible, the names and addresses of retailers should be obtained from local sources, such as telephone directories. Because directories may not be current, observations should also be made in markets noticed when the researcher visits retailers. Additional markets and retailers, that may be mentioned by respondents interviewed in Study 4 should also be visited as they are identified.

An initial visit will be made to all of the markets to make observations of the names and appearance of crops. At each market, samples of available crops, ingredients and products prepared from the crops will be purchased. Specific crops (eg. wheat) which are members of the same general category as the selected crop (eg. cereals) will be purchased. Each sample that is purchased will be assigned a code number and labeled to indicate the local name, the weight or the volume of the sample and the price of the sample. The local name will be defined as the name given to the sample by the retailer. A record will be kept of the date of purchase and the retailer from whom each sample was

purchased. This information will be summarized to identify the retailers who carry a wide selection of ingredients, products and crops within the selected category of crops.

After all of the samples have been collected, a standard procedure will be used to determine the weight of a standard unit of the crop (eg. 100 seeds, one piece). Controlled conditions will be used to make color prints of the samples of crops, ingredients and products. The prints and weights will be used as a control for the original appearance of the samples collected. A standard volume of each crop will be preserved, if necessary, and sealed in a transparent plastic bag. The bags will be coded, stored under controlled conditions and used as a reference for the appearance of the crops which were purchased. A second set of the samples will be treated in the same manner and stored for use in Study 4. The crops which were purchased will be visually compared. Samples which are not visually distinct from each other will be pooled and only one sample from each pool will be included in a set of other visually distinct samples being stored for Study 4.

Names assigned to the cultivars by the different retailers will be compared. The procedures used in the previous two studies will be used to determine the validity of the local names for the crops or products. Findings from the literature review and interviews with public officials will be used to assign botanical (genus and species) and English names to the crops which were purchased.

An observation form will be developed for use in a follow-up visit to the retailers who were selling a wide range of crops in the selected

crop category. The observation form will consist of a list of the crops and processed forms of the crops that were purchased from retailers. Categories for the processed forms of the crops (eg. whole, dehulled, dehulled and ground into flour) will be developed from an analysis of the processes required to prepare the ingredients and products that were purchased during the initial market observations. The observation form will be pretested and modified as necessary in at least one market. The final observation form will be used during a follow-up visit to the other retailers who were selling a wide range of crops and (or) products in the selected category. A separate observation form will be used to record the crops and processed forms of the crop which are available from each retailer. After the observation form has been completed, each retailer will be interviewed informally following the procedures and questions outlined in Appendix 15.

Findings from these follow-up visits will be tallied and used to identify crops and processed forms of the crops that are available from all of the retailers. The validity of the results of this study will be determined by comparing the list of retailers mentioned in Study 4 with the list of retailers contacted in this study. Retailers, who may be mentioned by the Frequent Users in a later study and who were not contacted in Study 3, will be visited as they are identified. The crops, ingredients and products available from these retailers will be used as a criterion for assessing the validity of results obtained from the observations and interviews in Study 3.

4.5 Study 4: Methods Proposed for Informal Interviews with Frequent Users of the Selected Crop

Leaders of associations on the list developed in Study 2 or persons designated by the association leaders will be advised of the purpose and methods for the background and questionnaire-based studies on the selected crop. The persons contacted will be asked to suggest the names of Frequent Users of the selected crop who might be interviewed and who have migrated to the selected community from regions of the country where there is a climate different from that of the selected community. A Frequent User will be defined as someone who routinely prepares and eats the selected crop or its products.

The names of Frequent Users of the product will be randomly selected from the list of all of the names suggested by all of the leaders. The Frequent Users will be contacted by association leaders, or by persons designated by them, to determine their willingness to be interviewed. Three to five Frequent Users will be informally interviewed in their homes.

During the interview, the crops and processed forms of the crops which were packaged and selected in Study 3 will be shown to the Frequent Users following the procedures outlined in Appendix 16. Notes taken during the interview will be rewritten into a more detailed account of the interview later the same day. The validity of information obtained from Frequent Users will be determined using the methods described in Study 1. If a consistent pattern for processing the selected crops, for using ingredients made from the crops, and for

using ready-to-eat products that contain the crops does not emerge from these interviews, another 3 to 5 Frequent Users will be selected and interviewed. The information obtained from these interviews will be compared to identify information that was given by most of the Frequent Users.

4.6 Study 5: Methods Proposed for Review of Cookbooks

Cookbooks for foods prepared in the selected country will be reviewed. The cookbooks will be obtained from libraries and bookstores. Only cookbooks which have been written by persons who have lived in the country where the study is conducted will be selected for this study. Home economists working in a national agency such as agricultural extension agencies, universities or nutrition institutes will also be contacted to locate additional books.

A list of the roles of the selected crop in regional, daily, seasonal and holiday meals and of the names of ingredients which can be made from crops in the selected category will be prepared, if this information is mentioned in the cookbooks. The index and table of contents of each cookbook will be used to locate recipes for products that were identified in Studies 1-4. Recipes identified by this method will be reviewed to generate a list of names for ingredients and products which contain crops in the selected category and of food processes which are associated with these crops. The procedures described in Study 1 will be used to determine the consistency of the information from the various cookbooks.

4.7 Study 6: Methods Proposed for Observations and Informal Interviews in Restaurants

Restaurants which serve foods that are normally prepared and eaten in homes of people in the selected country, will be visited to interview personnel and to purchase samples of products which have been prepared with the selected crops. The term "restaurant", as applied in this study, will include street vendors and cafeterias under private or public management. Thus visits will also be made to cafeterias of schools and hospitals in the selected community. Visits will be made to restaurants listed in the local telephone directory. Restaurants discovered while travelling to markets in Study 3 and interviewing Frequent Users in Study 4 will also be visited.

Products likely to contain ingredients made from crops in the selected category will be identified from menus and signs in the restaurants. The assistance of restaurant employees will also be used to identify products which are made from crops in the selected category. The cook or another employee will be asked to describe how these products were prepared. One serving of each of these products will be purchased on a "carry-out" basis.

All products that have been purchased will be compared later the same day. Comparisons will be made among products with the same name which were purchased in different restaurants. Color prints will be made of a standard volume of each product. The prints will be used as a permanent reference for the characteristics of the products. One product, which is similar to most of the other products with the same

name, will be chosen to represent all of the other products with the same name. Photographic prints of these products will be used later in the questionnaire-based survey (Study 8). Findings about products from this study will be compared with findings obtained in the five previous studies.

4.8 Study 7: Methods Proposed for Interviews with Consumers

The purpose of this study will be to:

a) train interviewers to ask the types of questions that will be included in Study 8,

b) identify the evaluative beliefs, important characteristics of a crop, that consumers associate with their use of crops in the selected category,

c) identify the normative beliefs that consumers associate with their use of crops in the selected category (e.g. beliefs about the types of people who influence the respondents' decisions to prepare and eat the selected crop),

d) identify the dishes that consumers prepare from the selected crop,

e) develop other questions for measuring the consumer acceptance and consumption of crops, and

f) pretest the wording of demographic questions that may be included in Study 8.

Respondents will be selected on a first contacted, first interviewed basis from names remaining on the list of Frequent Users prepared in Study 4. The association leaders, or persons they designate, will make the initial contact with respondents who are selected. Respondents will be contacted by the researcher to determine

their willingness to participate in the study. Those who agree to participate in the study will be interviewed in their homes.

Findings from Studies 1-6 will be used to select a subset of popular samples from the samples that were sealed into bags in Study 3, and used in Study 4. A popular sample will be defined as one that is used frequently by members of the selected community, available in the greatest volumes in most markets or used to prepare dishes which are eaten at a meal time by most members of the selected community. These samples will be shown to respondents during the interview. Between ten and thirty samples will be selected. Frost and Braine (1967) stated that this is an appropriate number to use with a Repertory Grid Technique.

A procedure used by Hamilton (1975) will be used to prepare a "ring binder" file that contains the questions for the interview and a separate form for recording the responses from each interview. The questions will be typed onto a series of small index cards which will be arranged in sequence and read during the interview. The dialogues necessary to introduce each section of the questionnaire will also be typed onto cards and included in the file. Open-ended questions about evaluative beliefs, normative beliefs, dishes that are likely to be prepared from the selected crops and demographic attributes of respondents will be asked in this study.

In the first part of the interview the samples will be placed in front of respondents and they will be instructed to remove any samples they have not prepared or eaten. These samples will not be displayed again in the remainder of the interview. The respondent will be asked

to name each of the remaining samples to verify that the samples have been correctly identified by the respondent. If a sample is not assigned a name which was used by retailers in Study 3, the respondent will be told the names that retailers use to refer to the sample. A Repertory Grid Technique described by Frost and Braine (1967) and applied by McFayden (1972) will be used to determine the evaluative beliefs consumers associate with the use of crops which are shown to them. The procedures in Appendix 17 will be followed.

In the second part of the interview, normative beliefs (NB) will be identified by following the methods described by Ajzen and Fishbein (1980). Respondents will also be asked to name and describe dishes that they are likely to prepare from crops which are shown to them. The demographic attributes of respondents will be determined by asking questions about the region of the country where the respondent was born, the regions where the spouse was born, the respondent's age and the languages spoken in the respondent's home. A record will be kept of phrases used during the interview to facilitate the rewording of the questions if necessary.

Responses to open-ended questions will be analyzed by listing all of the responses. Similar responses will be grouped into a common category. The number of respondents who use responses in each category will be used to identify the categories with a mode number of responses. Phrases used to clarify the meaning of questions will also be listed, grouped and the categories with a mode number of responses will be identified. A comparison will be made of the number of respondents who

assigned incorrect names to each crop, so that crops that were incorrectly named by most respondents can be identified.

The number of respondents who frequently use each crop will be compared, so that the crops used by most respondents can be identified. The frequency (e.g. times/week, month or year) which respondents say that they prepare and eat crops will be screened to select response categories of a closed-response question for measuring crop consumption in Study 8. Responses for questions measuring crop acceptance will be compared to identify questions that were understood by most respondents and that were also easy to administer.

4.9 Study 8: Methods Proposed for the Questionnaire-based Survey

A narrower definition for crop acceptance and the theory of Reasoned Action will be used as a basis for this study. Crop acceptance will be defined as a belief or feeling, that is measured by showing respondents a sample of a crop. A belief about the future use of a crop will be called an intention. A belief about the current or past use of a crop will be defined as an attitude. Measures of both attitude and intention will therefore be measures of crop acceptance. The purposes of the study will be to compare the strength of correlations between two different measures of crop acceptance and measures of crop consumption. Crop acceptance will be represented by measures of beliefs about the outcomes that consumers associate with their use of a crop. These beliefs will be compared by drawing an Image Profile of the beliefs associated with individual crops. This measure will be called the Profile measure of crop acceptance. Crop acceptance will also be

represented by measures of variables in the theory of Reasoned Action (see Appendix 2). This measure will be called a Predictive measure of crop acceptance.

A questionnaire-based survey will be conducted to measure evaluative beliefs and selected concepts [redacted] theory of Reasoned Action, that consumers associate with their consumption of a selected dish, cultivar and category of crops. The results of previous studies (1-7) will be used to select the new cultivar, crops, dish, time and context that will be specified in the questions used to measure crop acceptance and crop consumption. Between 15 and 30 crops which are in the same category as the selected new cultivar and which have been identified as being used frequently in any of the preceding studies will be shown to respondents in this survey. Two color coded notebooks will be used to display the samples. The same samples will be displayed in each notebook but a different randomly assigned sequence will be used in each. Pictures of prepared dishes will be selected from the color prints prepared in Study 6, provided that the selected crop is also the major dry ingredient in these dishes. Only dishes which were identified in previous studies (1-7), which are consumed most frequently and in greatest quantities will be selected. The pictures will be shown to the respondents during the survey to determine which dishes are prepared by respondents and how frequently each dish is prepared.

Respondents will be interviewed in their homes on two separate occasions. A structured and precoded questionnaire will be designed. Semantic differentials related to evaluative beliefs which were selected from those identified in at least one of the previous 7 studies will be

used for the Profile measure of crop acceptance. A measure of the subjective norm will be developed from the categories of normative beliefs that were mentioned by most respondents in Study 7. Between 5 and 9 evaluative beliefs will be selected from those which were mentioned by most respondents in Study 7. Questions will be designed to assign a weighting of importance to each of the 5 to 9 evaluative beliefs. Measures of these beliefs will be correlated to measures of other variables associated with the theory of Reasoned Action and to measures of crop consumption. Half of the respondents will be interviewed with each of the two notebooks of samples. The questions will be arranged in another notebook, as described for Study 7. A separate form will be developed to record responses from each interview.

During the interview, the interviewer will read questions related to the respondent's demographic attributes, liking of crops and crop consumption. The interviewer will record responses for these questions. Respondents will also be given a form and asked to place a checkmark in the position on a 7 point semantic differential scale which best corresponds to the evaluative beliefs, attitude, behavioral intention and subjective norm that they associate with samples. The respondents will be instructed to think about preparing and eating the samples of crops that they are viewing as a selected dish under selected conditions (e.g. with whom, where, when) as they place check marks on the form. Similar scales will be used to ask the respondents to assign a weighting of importance for the 5 to 9 evaluative beliefs that will be used with the Predictive measure of crop acceptance. After the interview, respondents will be given a sample of a new cultivar and instructed to

prepare the sample according to their usual practice for preparing currently available cultivars of the selected crop.

Respondents will be interviewed again after they have prepared and eaten the new cultivar. They will be asked to report their responses by placing a checkmark on the same set of semantic differentials that were used in the first interview. The respondents will be asked to describe how they prepared the cultivar and to mention any other comments that they have about the cultivar. These two questions will be open-ended rather than fixed response questions.

A group of respondents (20%) will be asked to keep a diary to record foods that were eaten, with whom, when and where. Half of these respondents (10% of the total respondents that were interviewed) will be asked to complete the diary before they are interviewed. The other half will be asked to keep the diary after the first interview. Up to 10 percent of the respondents will be asked to repeat an abbreviated form of the two interviews after the study has been completed.

Data will be coded and analyzed by computer using an available statistical package. The methods described by Coleman (1982) will be used to develop and compare profiles of the evaluative beliefs associated with each sample. Methods of analysis described by Ajzen and Fishbein (1980) will be used to correlate variables that measure selected concepts in the theory of Reasoned Action (see Appendix 2).

The number of years that respondents have lived in the selected community will be added to the age of the respondents at the time they moved to the community and compared with the reported current age of each respondent.

Information in each of the diaries will be analyzed by preparing a list of crops in the selected category that were eaten by each respondent. Dishes that were prepared from these crops and the conditions in which the dishes were eaten by each respondent (e.g. with whom, when and where) will also be listed. Categories of crops and dishes, used by mode numbers of respondents, will be compared with the frequency with which the same respondents said they prepared and ate the selected crops and dishes. Categories of conditions in which the dishes were eaten, by mode numbers of respondents, will be compared with the conditions that were specified for the semantic differentials included in Study 8. Responses in the interviews that were repeated with 10 percent of the sample will be compared with responses that were given by the same respondents during the original interviews as a test for reliability.

Cross-tabular analysis will be used to compare the percentage of respondents with specific demographic attributes in selected categories of crop consumption. Cross-tabular analysis will also be used to compare effects of the order for presenting samples on measures of crop acceptance. According to Guilford (1956), a coefficient of association less than + or - .20 represents a slight or almost negligible association for coefficients of association given in Guilford's Table. A difference of 20 percent or more between the number of respondents in cells of the cross-tabular tables will thus be considered an important deviation in this study. The strength of important correlations between various measures of crop acceptance and crop consumption will then be compared.

CHAPTER V

APPLICATION OF THE PROPOSED METHODOLOGY

1. Introduction

The proposed methodology was applied in a study of the consumer acceptance of a lentil cultivar in Canada. The purpose of applying the methodology was to compare the usefulness of obtaining information on the four objectives for this research by the methods proposed for each of the 8 studies. Usefulness was defined in accordance with the definition for utility that was developed by Carey and Sproles (1978). The definition for usefulness thus included the essentiality, manageability, validity and reliability of the methodology. It was not the purpose of this study to draw inferences from the attitudes and behaviors of respondents in the sample, to the attitudes and behaviors of a larger population.

The methodology was applied among a sample of respondents who were first generation members of a community of people who had come to Edmonton from a developing country. It was considered appropriate to test the methodology in Edmonton for several reasons:

a. The methodology included methods that were used either in 17 international studies that were conducted in developing countries or in cross-cultural research that was reported in the North American literature. The methods were therefore considered appropriate for research in developing countries.

b. All of the methods had been used in studies in North America.

c. The studies in North America were on food acceptance or the theory of Reasoned Action. The methods were thus considered appropriate for research on the consumer acceptance of crops in developed countries.

The methodology was applied by selecting a population of consumers, a category of crops and a specific new cultivar within the selected category. A population of respondents who came to Edmonton from a developing country where different languages are spoken in different regions of the country, was selected so that respondents could be drawn from different geographic groups. Data from the 1981 Canada Census, for the "country of birth" of people in Edmonton, were used to estimate the number of people from different developing countries that were living in Edmonton. A list of cultural associations in Alberta was used to identify cultural associations in Edmonton (Alberta Culture, 1984). India was selected for several reasons as the "country of birth" for respondents to be interviewed. The East Indian community was the largest of the communities in Edmonton with members who were born in a developing country. Many languages, including English, are spoken by members of this community. English is an official language of India and it is one of over 300 languages which are spoken there (Odynak, 1984).

Pulses were selected as the category from which a crop would be selected because pulses are produced in many developing countries and in Alberta. Pulses were defined as the dried edible seeds of cultivated legumes in the Papilionoideae family (Siegal and Fawcett, 1976). Lentils were selected from the group of pulses produced in Alberta, as the crop which would be evaluated. Dry beans, dry peas and faba beans

were not selected because greater quantities of lentils are grown and consumed in India than of these other pulses (FAO, 1977). In this chapter the 8 studies that were done to obtain information about the pulse varieties which are consumed by East Indians, the segments of the population which consume pulses, the conditions for consuming pulses and the characteristics of pulses which are of greatest importance to consumers are described.

2. Application of Studies

Study 1: Review of Literature

Articles on the food patterns of East Indians were identified in the Nutrition Abstracts Index. Additional references about the food patterns of East Indians were located from the list of references cited in those articles. Materials obtained from Alberta Culture, the University of Toronto, the Hyderabad Institute of Nutrition and the Andhra Pradesh Faculty of Home Economics (both in India) were also reviewed.

Study 2: Informal Interviews with Public Officials

The names of four members of an East Indian or Ismaili Cultural Association in Edmonton were obtained from Alberta Culture. One person associated with pulse breeding and 3 people involved in the marketing of agricultural commodities were informally interviewed by telephone. The remaining interviews were conducted in homes or offices.

Study 3: Observations and Interviews in Markets

Observations were made in a total of twenty grocery stores in Edmonton. The purpose of these observations was to determine the range of pulses available in the Edmonton stores. The stores were selected to represent international and national corporate chain stores, health food stores and stores that specialize in ethnic foods (eg. Arabic, Chinese, East Indian, German, Greek, Italian, Japanese and Portuguese foods). A telephone directory for members of the Ismaili community was used to identify grocery stores that specialize in East Indian foods. Additional stores were selected by screening the names of grocery stores listed in the 1985 Edmonton Yellow Pages. Stores with international, Asian and East Indian names were added to the list of stores in which observation would be made. Other stores were identified when the researcher drove to stores already on the list.

Retailers were contacted by telephone to determine if they were still in business and to verify their current names, addresses and business hours. The stores were visited between November 1985 and February 1986. Pulses, ingredients made from pulses and products containing pulses were purchased and coded. Lentil cultivars and products that contain lentils were purchased from several stores. The weight of 100 whole (200 split) seeds was determined. A 15 mL sample of each pulse was sealed in a transparent plastic bag and assigned a code number. A duplicate set of 60 sealed samples was made for use in Study 4.

Kay's (1979) description of pulses was used to assign English and botanical names to the samples. The observation form in Appendix 18 was developed from the names and processes that were associated with the crops, ingredients and products that were purchased.

From the notes taken during the initial visits to the stores, it was determined that the widest selection of pulses was available in stores which specialize in East Indian foods. A second visit to complete the observation form was only made to the stores which specialize in East Indian foods. Several of these stores were owned by the same families. Visits were thus made to the six stores which were owned by separate families.

The observation form was pretested by using it to classify the crops, ingredients and products that were available in one of the stores. This proved to be a distraction and hindered the cooperation of store employees. A more informal procedure for recording the inventory of the stores was therefore used in stores that were subsequently visited. At the store the researcher spoke first to the retailer to obtain information about the appearance of pulses and to obtain information about ingredients and foods that contain pulses. The researcher also indicated that she would like to make notes of the East Indian names of pulses and other foods. After leaving the store, the notes were transferred to the observation form. A separate form was used to record information for each store.

A third visit was made to each of the six stores so that the retailers could be interviewed. The questions raised during the interview are listed in Appendix 15. Retailers in two additional stores

that specialize in East Indian foods were also interviewed. The sample of retailers included East Indian, Pakistani or Ismaili women and men who were estimated to be between the ages of 20 and 60. The retailers were from North India, South India, Fiji and Canada.

The questions for the informal interview were pretested by interviewing one retailer. It was again noted that by consulting the guide during the interview, the interview became a formal procedure which reduced the cooperation of respondents. The procedure for interviewing was therefore modified. The interviewer memorized questions on the guide and took no notes during the interview. The questions were asked in an informal conversation that was initiated as the interviewer was purchasing products from the shop. A written report of the interview was prepared after the interviewer left the store.

Study 4: Interviews with Frequent Users

Seven Frequent Users of pulses were identified by members of the Alberta Council of Cultural Associations. A Frequent User was defined as someone who prepares and eats pulses at least once every two weeks. The first contacts with the Frequent Users were made by members of the Alberta Council of Cultural Associations. One of the Frequent Users taught East Indian cooking and was identified through a member of a local continuing education program. All of the Frequent Users were members of the East Indian community. One of the Frequent Users was born in Canada, three were born in India and three were born in East

Africa. All of the respondents were women who were married to persons who were either born in East Africa or various regions of India.

A total of 45 samples of pulses was selected by sorting the bags of pulses that were prepared in Study 3. The bags were sorted into three groups: whole, split and dehulled seeds. Samples in each group were compared by visual inspection. Samples that differed in appearance from others in the groups were selected. The samples were displayed in a notebook binder that was shown to each Frequent User during the interview (see Appendix 19). Samples in the same genus were displayed on the same page of the notebook (see Appendix 19). An additional 10 samples of whole and 5 samples of split lentils was added to the notebook. These lentils were obtained from an official in a crop improvement agency and from retailers. Initially, all of these lentil samples were shown to Frequent Users. Samples obtained from the crop improvement official were subsequently removed from the notebook because respondents could not identify those samples as being new cultivars. Questions developed from the questions in Appendix 16 were used to probe each Frequent User during an informal interview.

Study 5: Review of Cookbooks

A total of 9 cookbooks, with recipes for products that are prepared and eaten in India, were reviewed (Singh, 1981; Solomon, 1977; Lal, 1976; Singh, 1976; Ekambaram, 1974; Jaffrey, 1973; Time-Life, 1969; Day, 1963; Chowdhary, 1954). The cookbooks were written by home economists in India and by other people who were born in or had lived in India.

Study 6: Informal Interviews in Restaurants

Visits were made to all restaurants that serve East Indian foods in Edmonton. Six restaurants were identified through the telephone directory, and by observation while driving to stores in Study 3. A telephone call was made to each restaurant to determine hours of service. Each restaurant was visited and the procedures outlined in Appendix 20 were followed. Eleven products which contain pulses were identified by visually inspecting foods available from buffet services, by reading notes included on menus and by asking the cooks or waiters to indicate products which contain dal or gram. Color prints were taken of these products. The respondents included five men and one woman who were cooks or waiters in the restaurants. The respondents were members of the East Indian community who were born in Canada, North India, East Africa or Central India.

Study 7: Interviews with Consumers

The respondents were selected by a non-probability method from the list of Frequent Users that was prepared in Study 4. The persons who suggested names of potential respondents were asked to contact respondents they had named and to advise them to expect a telephone call from the researcher. Each potential respondent was contacted by telephone following the procedures outlined in Appendix 21. The findings of Studies 3 and 4 were used to identify twenty popular pulses (see list in Appendix 33).

A questionnaire was developed and pretested with 5 respondents. The purpose of the pretest was to develop the researcher's interviewing skills, to evaluate the wording of the questionnaire and to time the interview. Each interview lasted less than 45 minutes. The questionnaire was revised and again pretested to clarify the meaning of various questions.

In the proposed methodology it was planned that a Repertory Grid Technique would be used to develop a list of evaluative beliefs which consumers associate with their use of the selected crops. After pretesting this technique with two respondents it was concluded that the rigorous procedures for the technique placed respondents in an examination or test situation. It was not possible to gain the cooperation of the respondents while strictly following the procedures for the Repertory Grid Technique. The replacement of this technique with a sorting procedure resulted in a less formal interview. It was possible to develop evaluative beliefs with this procedure because respondents were willing to follow the procedure. The final version of the questionnaire and form used to record responses for each interview appear in Appendices 22-23.

Questions for measuring crop consumption and crop acceptance were pretested in Study 7 in order to develop questions required in Study 8. Questions requiring respondents to rank or rate samples were used by researchers in the 17 international studies that were included in the Content Analysis for this research (see Appendix 9). For this reason, questions requiring respondents to rank or rate their acceptance and consumption of crops were pretested in Study 7. A nine point scale was

used to report hedonic ratings following the recommendations of the IFT (1981) and Meiselman (1984). A seven point scale was used to report behavioral intentions following the recommendations of Ajzen and Fishbein (1980).

Study 3: Questionnaire-based Survey

A list of 18 associations, which are members of the Council of India Societies of Edmonton, was obtained from the Council. Eight associations, with members from different provinces in India, were selected from the list by officials of the Council. These associations were selected because they had a membership of 30 or more married couples who emigrated from India to Canada. Leaders of each association were contacted by telephone to arrange for an interview. The community leaders were advised of the purpose of the study and were asked to recommend the names of 10-30 members of their association who might be willing to cooperate in the study. An additional 10-30 members were selected by assigning numbers to names on the membership lists for each association. The sampling frame for the study was a subset of the names on six membership lists. The sampling frame included 267 names. A random numbers table was used to select respondents from each list.

The researcher contacted the respondents by telephone to make an appointment for the first one hour interview. Follow-up calls were made until 40 respondents were contacted. The final sample of respondents included 25 members of one association and a total of 15 members from five additional associations.

The findings from Studies 1-7 did not include information about the relative frequency with which cooked dal dishes were made with a dry or wet consistency, or from whole or split pulses. The words dal maharani, chole, plain cooked dal and sambar were identified in Studies 3-7 as names for dishes which were made from split or whole pulses and which had a wet or dry consistency. No one name was therefore selected for dishes which were made from split or whole dals and dishes which have a wet or dry consistency.

A total of 16 samples of pulses, that could be prepared as either dry or wet types of cooked dishes, was selected for this study. Eleven of the samples were identified in Studies 3, 4 or 7 as being a pulse that is frequently used. Split chickpeas, though frequently used, were not included because they were not visually distinct from other samples. Split black mung beans were included to provide a comparison with consumer's attitudes to whole black mung beans. Whole cowpeas were included because consumers in Study 7 said that they used this pulse.

A total of four lentil samples obtained from a crop production official in Study 2, were found to be visually distinct from samples in the markets visited in Study 3. The results of the literature review indicated that only Eston and Laird lentils were grown on a commercial basis in Alberta. These two lentils were available in sufficient quantities to provide consumers with a sample that could be prepared at home as a cooked dish. A bench scale barley pearler was used to determine if both Laird and Eston lentils could be dehulled. Both types of lentils were easily dehulled. Eston lentils rather than Laird lentils were selected as the new cultivars for this study because these

samples were not available in the East Indian grocery stores visited in Study 3. A whole and split form of Eston lentils was included with the samples to provide another comparison of consumer attitudes to a cultivar presented in two forms. Commercial Laird lentils, a variety available in the retail stores visited in Study 3, were included for comparison with whole Eston and Egyptian lentils.

A standard portion of each sample was sealed in a plastic packet and placed on a small index card. The cards were arranged in a random order and placed in a notebook (see Appendix 19). Duplicate cards of samples were placed in a different random order in a second notebook. Respondents were shown pictures of prepared dishes that were grouped into six categories according to the processes required to prepare each dish (see pictures in Appendix 24 and description of dishes on page 202). Respondents were asked to report evaluative beliefs that they associated with their preparation and consumption of each of the 16 crop samples under specific conditions (as a cooked dal dish that they might prepare within the next two weeks, at home, with members of their household). Variables that represented concepts in the theory of Reasoned Action were measured with questions about the following four samples: whole Egyptian, split Egyptian, whole Eston and split Eston lentils.

Eston lentils produced in Canada were purchased from a wholesaler. Half of the lentils were processed in a mini-dehuller that was designed by the Prairie Regional Laboratory in Saskatoon. The dehuller was operated at 1,900 r.p.m. and attached to a 3 h.p. motor. The lentils

were processed for one minute in six 7.5 kg lots. The same type of dehuller was used to dehull various lentils and other pulses in a study by Reichert et al. (1984).

The cotyledons were separated from fragments of the detached seed coats by winnowing. The winnowed lentils were shaken through No. 12 and No. 16 Canadian Standard Tyler sieves. Lentils which were not processed, and dehulled lentils, were hand sorted to remove extraneous materials and grains. A standard portion (1 cup) of each sample was placed in two 13 x 18 cm self-locking plastic bags. This quantity was equivalent to four servings of cooked dal.

The questionnaire and response forms for the study were developed from the findings of previous studies. Some respondents in Study 7 classified crops according to the dishes that were prepared from each crop. Questions about recipes that may be prepared from the samples were therefore included in the questionnaire for Study 8. The questions for ranking a specified set of samples in Study 7, based on the respondent's liking of the samples, were not used because consumers could only rank samples which they had prepared or eaten. Respondents were therefore asked to select the three samples they liked the most. The crops that were identified by respondents in Study 7 as being those that they used frequently had different levels of interpretation regarding the actual frequency of use. In practice, respondents defined "frequently" as being daily, several times a week, once a week and every two weeks. An open-ended question was therefore used in Study 8 to measure respondents' reported past consumption of pulses and dishes prepared with pulses. Consumers in Study 7 did not comment on the relative ease

of using a nine versus a seven point hedonic scale to report their liking of samples and likelihood of preparing and eating the samples. A seven point scale was selected for Study 8 so that the scale would correspond with the seven point scales used to measure variables associated with concepts in the theory of Reasoned Action.

A group of 18 evaluative beliefs was selected for the study. The evaluative beliefs, Is Filling and Gives Physical Strength were not identified in Studies 1-7 but they were included in Study 8 as additional measures of the evaluative belief Is Nutritious. The remaining 15 evaluative beliefs were selected to represent evaluative beliefs identified from the findings of Studies 1-4 and 7. The evaluative beliefs were also selected to represent sensory (aesthetic), functional, compositional, socio-pyschological and economic categories of evaluative beliefs. These classes of evaluative beliefs were used to categorize studies in the Content Analysis study for this research (see Appendix 9).

A total of 6 of the 18 evaluative beliefs was selected as evaluative beliefs that would be weighted for importance, correlated to an overall measure of attitude and correlated to a measure of behavioral intention according to the theory of Reasoned Action (see Appendix 2). The beliefs that the crop is Nutritious, Easy to Mash, has a Short Cooking Time, Needs Soaking, and Is Easy to Digest were selected because most of the respondents in Study 7 mentioned these evaluative beliefs and because they were also identified in at least one of the previous seven studies. The evaluative belief My Household is Accustomed to This

was selected as a comparison for the measure of subjective norm associated with the theory of Reasoned Action.

The questions and response forms in Appendices 25-26 were pretested with five respondents to train the interviewer and to time the interviews. The first interview required 45 minutes and the second required 15 minutes. At the end of the first interview respondents were given the two samples of Elton lentils. Half of the respondents were instructed to try the whole sample first, the other half were instructed to try the split sample first. At the end of the second interview, after completing a two week diary and after [illegible] ised version of the two interviews, respondents were given [illegible] preciation for their participation in the study.

The data were coded [illegible] erred to coding sheets and keypunched into a computer data f[illegible] r MIDAS (Michigan Interactive Data Analysis System) was used to determine response frequencies, means, column percentages within various response categories and the correlations between selected variables (Fox and Guire, 1976). Responses to the open-ended question which respondents used to report the frequency with which they ate each pulse and dish, were reviewed and collapsed into seven categories. "Don't Know" and "Not Appropriate" responses for evaluative beliefs were coded as missing values. Correlations between different measures of crop acceptance and consumption were compared on a pulse by pulse rather than an aggregate basis. Comparisons were made of the numbers of significant correlations between reported past frequency of consumption or behavioral intention and evaluative beliefs that were included and not included in the

Predictive measure of crop acceptance. Image Profiles were drawn for each crop sample by plotting the mean scores of evaluative beliefs that were associated with each crop. The profiles were compared to identify similarities and differences in the Image Profiles for the pulses and for whole and split forms of the same pulse.

CHAPTER VI

RESULTS AND DISCUSSION

1. Background Studies (Studies 1-7)

Results from Studies 1-7 that relate to information about Cultivars, Consumers, Conditions for Using Crops and Evaluative Beliefs are summarized in Appendices 27 to 33. Comparisons of the information collected about each topic in these studies was facilitated by coding the information as it was collected. It did not appear necessary to code the questions, in advance, according to the topics in Appendix 13. The process of coding was, however, time consuming and it is recommended that questions in future studies be coded in advance.

Questions answered in each study are designated with an "x" in Table 11 and the information is coded as indicated in Appendix 13. "Useful" information was selected to develop the questionnaire-based survey and is designated by a bold-faced "x". Usefulness was defined according to the definition for utility that was developed by Cary and Sproles (1978). This definition includes 4 factors: essentiality, manageability, validity and reliability.

Table 11: Summary of Information About Specific Topics (1.1 to 4.1) Collected in the 7 Background Studies for the Questionnaire-based Survey (Study 8)

An "x" in bold-faced print indicates the studies that were the most useful method for obtaining information about the corresponding topics. Useful was defined according to Cary and Sproles (1978) definition for utility.

	Studies (see legend below for number codes)						
Specific Topics	1	2	3	4	5	6	7
Cultivars							
1.1*	x	x	x	x	x		x
1.2	x		x		x		
1.3	x		x				
1.4	x		x	x		x	x
1.5	x						
Consumers							
2.1	x						
2.2	x	x					
2.3		x					x
2.4	x	x					
2.5	x	x	x	x			x
Conditions							
3.1	x	x	x		x	x	x
3.2	x		x	x	x	x	x
3.3	x		x	x	x	x	
Evaluative Beliefs	x	x	x	x	x		x

* (Numbers in this table are cross-referenced to those in Appendix 13).

Legend for Codes of Studies:

1 = Literature Review
2 = Interview with Public Officials
3 = Market Observation and Interviews
4 = Interviews with Frequent Users
5 = Review of Cookbooks
6 = Restaurant Observations and Interviews
7 = Interviews and Consumers

1.1. Methods for Obtaining Information About Cultivars

The literature review (Study 1) provided extensive information about the appearance of crops and the English and botanical names of crops in the selected category (i.e. pulses). This information was used to purchase cultivars in the market place (Study 3). Information about the relative amounts of pulses grown in various agro-climatic zones was also obtained from the literature review. This information was not used for the questionnaire-based survey in Edmonton (Study 8). Such information could however be used to determine if local as opposed to imported cultivars are purchased.

Interviews with public officials (Study 2) provided information about the English names and appearance of new cultivars that were field-tested in crop improvement programs. This information was used to select and obtain samples of new cultivars for the questionnaire-based survey (Study 8). The local names and appearance of crops in the selected category (in this case pulses) were obtained during the market observation study (Study 3). This information was used to designate local names for each sample, and to prepare samples that were shown to respondents during the questionnaire-based survey. Crops which were used frequently by Frequent Users were identified in Study 4. Crops which were not used frequently were identified by Consumers in Study 7. This information was used to select the samples that were included in the questionnaire-based survey (Study 8).

The decision to measure crop acceptance by showing respondents a crop and asking them to use the crop, rather than measuring crop

preference by simply naming a crop, was supported by the findings in several of these studies (Studies 1 and 4-7). (see Appendices 27 and 30-33). A variety of names and spellings for names of pulses was obtained from the literature (Study 1), interviews with Frequent Users (Study 4), review of cookbooks (Study 5), restaurant observations (Study 6) and interviews with Consumers (Study 7). It was concluded that the practice of naming samples rather than showing samples would not ensure that the researcher and respondents were speaking about the same crop. Frequent Users however, mistakenly identified several of the samples they viewed (see Appendix 30). It was thus apparent from background studies that samples that do not look distinctly different can be incorrectly identified.

1.2. Methods for Obtaining Information About Consumers of Cultivars

Information on the attributes of consumers [redacted]e members of various associations was obtained by interviewing public officials (Study 2). This information was used to select respondents and to develop questions for measuring the attributes of respondents for use in the questionnaire-based survey.

Information suggesting that consumption patterns are related to the cultural attributes of consumers was obtained from the literature, public officials, market observations and the review of cookbooks (Studies 1-4 see Appendices 27-30). Cultural attributes included attributes such as language, years of residence in a place, age on arrival to Canada, place of birth, religion and past town or province of residence. Frequent Users were born in India, were familiar with and

had prepared more of the selected crops than the Users who were not born in India. This information was used to justify the selection of only members of the first generation, in a community, for the subsequent interviews in the background studies and the questionnaire-based survey.

1.3. Methods for Obtaining Information About Conditions for Using Crops

The relative importance of different conditions for consuming the selected crops and the frequency with which pulses are used was obtained by interviewing Frequent Users (Study 4). This information was used to select dishes that were cited in subsequent background studies and in the questionnaire-based survey. The review of recipes in cookbooks (Study 5) provided the richest source of names for products which are prepared from pulses and the most detailed descriptions of the methods for preparing these dishes (see Appendix 31). This information was used to identify pulse products listed on menus in restaurants and to determine the nature of dishes that were mentioned by Frequent Users and Consumers (Studies 4 and 7). The appearance of dishes which are prepared from pulses was documented by photographing samples that were purchased from restaurants (Study 6). These pictures were used during the questionnaire-based survey.

A list of the dishes that are prepared on a frequent basis and in relatively greater quantities was developed from the interviews with the Frequent Users and Consumers (Studies 4 and 7). It was difficult to record, interpret and therefore use information about conditions for

using crops, because the researcher was not familiar with these dishes. The researcher could not visualize the products and methods for preparing the products.

The names of over 30 dishes which could be prepared from pulses were identified from the background studies (see Appendices 28-33). Observations in markets and restaurants indicated that some pulses were prepared in many ways and other pulses were prepared in only a few ways (see Appendices 29 and 32). Frequent Users and Consumers indicated that some pulses are prepared as specific dishes for specific occasions (see Appendices 20 and 33).

A list of the dishes prepared on a frequent basis and in relatively greater quantities was developed from the interviews with Frequent Users and Consumers (Studies 4 and 7). It was difficult to record, interpret and therefore use information about conditions for using crops, because the methods and ingredients for dishes with the same name varied. The products could not be visualized by simply reviewing the names of the products and descriptions of the methods for preparation.

1.4 Methods for Obtaining Evaluative Beliefs

The literature review, interviews with public officials, market interviews and restaurant observations each gave between 2 and 6 evaluative beliefs related to the sensory, economic, functional, compositional and socio-psychological attributes of selected cultivars (see Table 12). Researchers (experts, retailers, restaurant employees) identified beliefs in these studies (Studies 1-3 and 5). Most of the evaluative beliefs (12 out of 18) identified in these studies were

Table 12: Numbers of Different Types of Evaluative Beliefs that were Mentioned in Different Studies

Types of Evaluative Beliefs	Studies* 1	2	3	4	5	6	7
Sensory	4	2	2	8	4		1
Economic		1		11			1
Functional	1			13			13
Compositional		1		13			4
Socio-Psychological	1			9			4
Other (quality,) (availability)		2					
Totals:	6	6	2	54	4	0	23

*Key to Studies

1 = Literature Review
2 = Interviews with Public Officials
3 = Market Observations and Interviews
4 = Interviews with Frequent Users
5 = Review of Cookbooks
6 = Restaurant Observations and Interviews
7 = Interviews with Consumers

Note: Evaluative Beliefs were developed with consumers in Studies 4 and 7. Evaluative Beliefs were developed with researchers (experts, retailers restaurant employees) in the remaining Studies (Studies 1-3, 5 and 6).

related to the sensory attributes of cultivars. These studies did not involve consumers as a source of evaluative beliefs.

Consumers were used to identify evaluative beliefs in Studies 4 and 7. A total of 23 and 54 evaluative beliefs were identified, respectively (see Table 12). Evaluative beliefs obtained from consumers related to the sensory, economic, functional, compositional and socio-psychological attributes of the selected cultivars. Quantitatively and qualitatively more evaluative beliefs were identified in these two studies with consumers than in the studies with others (the experts, retailers and restaurant employees in Studies 1-3). It was concluded that it is valid for the researcher to develop evaluative beliefs for a questionnaire-based survey using consumers (Studies 4 and 7) rather than with others (the experts, retailers and restaurant employees in Studies 1-3 and 5). Consumer-generated evaluative beliefs were used in Study 8.

Two different methods were used to generate evaluative beliefs from interviews with consumers. Frequent Users were shown one sample of a pulse crop at a time and they were asked to report the advantages and disadvantages of preparing a dish with that sample. This procedure was repeated with each of the samples that the Frequent Users said they used frequently. The procedure was similar to that described by several researchers (Ajzen and Fishbein, 1980; Boyd et al., 1981). Consumers (in Study 7) were however asked to report the advantages and disadvantages of preparing food dishes from those samples that they indicated that they used. The samples included both those used frequently and infrequently. Consumers viewed the samples as a group rather than one by one. Frequent Users generated many more evaluative

beliefs than the consumers in Study 7 (see Table 12). The method used to develop evaluative beliefs with Frequent Users was therefore a richer source of evaluative beliefs than the method that was used with consumers in Study 7.

As indicated in this step by step analysis of Studies 1 to 7, judgements were made regarding the Cultivars, Consumers, Conditions for Using Crops and Evaluative Beliefs that were subsequently incorporated into the questionnaire-based survey.

2. Validity and Reliability of Questionnaire-based Survey

Consumption patterns reported by respondents in the questionnaire-based survey were validated by comparing survey answers with actual records maintained by 20% of the respondents over a two week period. In addition, 10% of the respondents repeated the questionnaire-based survey as a means of determining the reliability of responses. A record was also kept of the comments that respondents made about the questionnaire during the interview (see Appendix 34).

2.1 Consumption Patterns

Diaries were completed by 6 of the 7 respondents who had agreed to keep records of their food consumption patterns. Respondents prepared and ate pulses 1 to 7 times during the two weeks that they kept a diary. Analysis of the frequency of consumption for individual pulses could not be made because respondents did not specify pulses that were used to prepare all of the dishes that they listed in the diaries. Dish 1, a

boiled pulse, was the only dish that was listed in all 6 diaries. Dish 1 was eaten 2 to 7 times a week. Meals were eaten at home with members of the family at least 5 days a week by 5 of the 6 respondents. These situations for using crops corresponded with the conditions specified in the questionnaire-based survey (Study 8). It was therefore concluded that the methods used for selecting conditions and dishes to be specified in the survey were valid. The recorded intakes for Dish 1 (the boiled pulse dish) and pulses corresponded with the frequency of consumption for Dish 1 and pulses that the same respondents reported in the questionnaire-based survey.

The reliability of reported frequencies of consumption for pulses and dishes that were not listed in the diaries was evaluated by examining the frequencies that were reported in the original and repeated interview. Frequency of consumption for pulses and dishes which were not listed in the diaries differed quite markedly, by as much as once in 2 weeks to once in 6 months, between the original and repeated interviews. Frequency of consumption for pulses and dishes that were not recorded in most of the 6 diaries were therefore considered unreliable. The finding that there is a much clearer relationship between dislike and non-use than between liking and using has been reported by other researchers (Randall and Sanjur, 1981). Other researchers have also observed that recalled intake for foods which are not major components of meals or which are eaten infrequently is not very accurate (Mullen et al., 1984).

The method of validating frequency of consumption by comparing questionnaire results with diary records required more of the

respondent's time than the method of comparing frequency reported in an original and repeat interview. The diaries were difficult to analyze because respondents did not report the ingredients of all dishes that were listed in the diaries. Respondents did not use mutually exclusive names to report dishes and crops that they consumed. For these reasons it was concluded that repeat interviews were more useful than diaries for validating studies of the consumer acceptance of crops.

2.2. Evaluative Beliefs

Evaluative beliefs that were scored on a seven point scale in both interviews were compared. Between 79 and 89% of the scores for evaluative beliefs that were reported by respondents in 7 original interviews were the same or one point different from the scores reported by these respondents in the repeated interview. The reliability of the semantic differentials that were included in Study 8 was therefore similar to the reliabilities reported by other researchers (Fewster et al., 1973; Osgood et al., 1957).

3. Results of Questionnaire-based Survey

3.1 Attributes of Respondents

The 40 respondents who answered the questionnaire-based survey in Study 8 were selected by contacting 84 of the 267 names on the list used as the sampling frame for this study. This gave a response rate of 46.4% and represented 15.0% of the respondents on the initial list. One respondent dropped out of the study after the first interview. The

reasons that respondents gave for not wishing to participate in the study related to their lack of time, or interest, poor health, or entertainment and travel plans.

The categories that respondents used to report their current age were based on 5-year intervals. For 15% of the respondents, their reported age category was not the same as the sum of their age on entry into Canada and years of residence in Canada. The reported age of these respondents however, differed from the sum of the respondent's age on entry by 3 years or less. Responses for these three questions were thus quite reliable. The frequency distributions for respondent's age on entry, years of residence and current age were similar in trials with respondents who viewed samples in each of two sequences. The distributions for these demographic variables were also similar among respondents who were selected by an association leader and those who were selected at random.

In the description of methods proposed for Study 8, it was stated that a deviation of 20% or more between the percentages of respondents in different cells of a cross-tabular table, would be considered an important deviation (see page 57). No important deviations were found among the percentages of respondents who viewed samples in the two different sequences. The results of the study may have been biased, however, by fatigue effects, because several respondents commented about the length of time required to evaluate so many crops and beliefs (see Appendix 34). It was concluded that both samples and evaluative beliefs

should therefore be presented in more than one sequence in questionnaire-based surveys of the consumer acceptance of crops.

One to five of the samples were mistaken for other pulses by 1 to 4 of the respondents (see Appendix 34). Both Frequent Users (Study 4) and Consumers (Study 7) incorrectly identified some samples (see Appendices 30 and 33). The practice of measuring crop acceptance by showing samples of crops, therefore, may have led to response errors in this study. It was concluded that the names of samples should be stated when samples are shown to respondents in future research of this nature. This practice ensures that samples are correctly identified before respondents report their evaluative belief about the samples.

Respondents did not use all of the names that were obtained from restaurant employees and cookbooks to identify the dishes in the pictures. Dish 1 was not called dal or chole by 20% (8) of the respondents. A greater percentage of respondents who were members of Association A identified Dish 1 as dal and chole (see Table 13). Dishes 2 and 3 were not called sambar and dosai by 30% (10-12) of the respondents. Both of these names refer to dishes that are used in South India. These findings indicate the importance of using pictures rather than names of dishes to represent dishes that are prepared from a crop.

The pictures used in Study 8 did not include all of the dishes that respondents prepared from the crop samples. Up to 45% (15-18) of the respondents mentioned the names of other products that should be included in the categories for Dishes 4 to 6. Several dishes and names for dishes that were used by some ethnic groups in South India were not represented in the study. It was apparent that dishes and names for

Table 13: Percentage of Respondents Who were Members or Non-members of Association A and had Specific Attributes (with respect to Ethnicity, Crop Consumption and Crop Acceptance)

Ethnic Attributes	Members	Non-Members
Used Restaurant or Cookbook Name for Dish 1	96.0% n = 25	53.3% n = 15
Speaks Language A as a First Language	64.0% n = 25	0.0% n = 15
Not Born in Province A	32.0% n = 25	73.0% n = 15
Crop Consumption Attributes		
Reported That They Ate Dish 2 Frequently	12.0% n = 25	71.4% n = 14
Ate Dish 2 More Frequently than Twice a Week	8.6% n = 23	64.3% n = 14
Eats Dish 3 Once a Month	77.3% n = 22	42.8% n = 14
Eats Dish 4 At Least Once a Week	43.4% n = 23	6.7% n = 15
Eats Dish 5 Once a Month or less Often	41.7% n = 24	73.3% n = 15
Has Used Laird Lentils	64.0% n = 25	40.0% n = 15
Has Used Whole Egyptian Lentils	72.0% n = 25	46.7% n = 15
Has Used Whole Black Mung Beans	88.0% n = 25	33.3% n = 15

Note: "n" indicates number of respondents for calculation of percentages for members of that group.

Table 13: Percentage of Respondents Who were Members or Non-members of Association A and had Specific Attributes (with respect to Ethnicity, Crop Consumption and Crop Acceptance) (continued)

Does NOT Use This Pulse Frequently	Members		Non-Members	
Red Kidney Beans	72.0%	n = 25	93.3%	n = 15
Split Green Mung Beans	40.0%	n = 25	80.0%	n = 15
Split Pigeon Peas	92.0%	n = 25	66.7%	n = 15
Split Oily Pigeon Peas	72.0%	n = 25	33.3%	n = 15
Did Not Complete Semantic Differentials for These Pulses as Respondents Said They Did Not Use This Pulse				
Laird	24.0%	n = 25	66.7%	n = 15
Whole Egyptian Lentils	20.0%	n = 25	53.3%	n = 15
Whole Black Mung Beans	8.0%	n = 25	53.3%	n = 15
Crop Acceptance Attributes				
This is NOT one of The Most Liked Pulses				
Yellow Chickpeas	45.8%	n = 25	92.9%	n = 14
Red Kidney Beans	54.2%	n = 24	92.9%	n = 14
Whole Black Mung Bean	62.5%	n = 24	100.0%	n = 14
Split Green Mung Beans	87.5%	n = 24	35.7%	n = 14
Split Pigeon Peas	95.8%	n = 24	71.4%	n = 14
Split Oily Pigeon Peas	66.7%	n = 24	42.9%	n = 14

Note: "n" indicates number of respondents for calculation of percentages for members of that group.

dishes obtained from cookbooks and restaurant employees in this study reflected an ethnic bias.

These findings suggest that it is also necessary to use ethnic and geographic criteria to select cookbooks and restaurants that are representative of foods served by all of the ethnic groups that are included in the sample for a questionnaire-based survey. These findings also suggest that a procedure of obtaining prepared dishes from Frequent Users who were born in various regions of the selected country may be used to obtain names and pictures of foods which are not mentioned in cookbooks or served in restaurants.

There were several important deviations (i.e. a deviation of 20% or more) between the percentages of respondents with various attributes who were or were not members of Association A (see Table 13). The finding that association membership is related to ethnic, crop consumption and crop acceptance attributes indicates that the ethnic and crop consumption attributes of respondents should be measured in studies of crop acceptance. This practice enables researchers to report scores of crop acceptance for different groups of respondents (e.g. respondents with specific ethnic and crop consumption attributes).

Members and non-members of Association A, or their spouses, were born in India and were from a first generation of people who emigrated from India to Canada. Members of Association A generally spoke the same language and reported the same province of birth (see Table 13). Despite a lengthy residence in Canada (2 to 26 years for both groups of respondents), crop acceptance and consumption attributes of members

differed from that of non-members. These observations suggest the reliability of the assumption that ethnic groups retain their food habits when they emigrate to another country.

Several investigators have found that people who move from one country to another retain the food practices of their forbearers (Desai et al., 1983; Campbell and Loewen, 1981; Anderson and Alleyne, 1979; Forchner, 1982). Researchers in Guatemala noted that respondents from 3 different ethnic groups who resided in Guatemala City reported attitudes and consumption patterns that were similar to those reported by members of the same ethnic groups in other areas of Guatemala (Watts et al., 1987, 1984). Thus newcomers who move from one country or community to another, tend to retain their food practices. It was therefore considered valid to select respondents in one community on the basis of province of birth and language spoken (see methods for Studies 4, 7 and 8).

3.2 Consumption Patterns

Information obtained from the literature review, market observations and review of cookbooks did not provide valid information about the popularity or the frequency of consuming specific cultivars. Information from these studies suggested that lentils are an important food crop in India and a popular crop among members of the East Indian community in Edmonton (see Appendices 27, 29 and 31). Lentils were however not eaten frequently by 39 of the 40 respondents included in the questionnaire-based survey. It was concluded that the name "lentils"

was used in a general sense to refer to pulses rather than to Lens esculenta or Lens culinaris in these studies.

Six of the pulse samples were not used often by most (32 to 39) respondents (see Table 14). It was possible to identify cultivars which were not popular or were not used frequently by interviewing Frequent Users and selected Consumers (Studies 4 and 7). All samples that were used less than once a week by the selected Consumers (Study 7) were also used infrequently by most respondents for the questionnaire-based survey. It was concluded that cultivars which are used infrequently by various ethnic groups can be excluded from the samples for the questionnaire-based survey on the basis of responses obtained from consumers in Study 7.

A total of 95% of the respondents ate a boiled pulse dish (Dish 1) at least once a week. Most (73.7%) of these 38 respondents ate Dish 1 daily to twice a week. A dish prepared with vegetables and boiled pulses (Dish 2) was eaten at least once a month by 32.5% (13) of the respondents. A total of 80% (32-36) or more of the respondents did not eat Dishes 3 to 6 more than once a month. Dish 1, the dish respondents were requested to consider while scoring evaluative beliefs, was prepared most often by most of the respondents. These findings indicate that the methods used provided a valid identification of the dish most used by the respondents (see Study 4 method).

The percentages of respondents who ate both Dishes 1 or 2 daily and consumed various pulses often are reported in Table 15. These findings and the comments that respondents made about crops and dishes, suggest that a number of the pulses were not used in the preparation of

Table 14: Percentage of Respondents in Questionnaire-based Survey Who Did Not Use 6 Selected Pulses Often

Pulses	Percentage of Respondents Who Did Not Use this Pulse Often	
Whole Black Mung Beans	85.0	(34)
Whole Egyptian Lentils	97.5	(39)
Whole Laird Lentils	95.0	(38)
Whole Red Kidney Beans	80.0	(32)
Split Pigeon Peas	82.5	(33)
Split Yellow Peas	85.0	(34)

* All of these crops were not used at least once a week by 4 or more (most) Consumers in Study 7 (see Appendix 33).

Note: Numbers in parenthesis indicate number of the 40 respondents who did not use that pulse often.

Table 15: Percentage of Respondents Who Ate Dish 1 or 2 Daily and Who Ate Various Pulses Often

	Respondents who Ate Dish 1 Daily n = 29	Respondents who Ate Dish 2 Daily n = 11
Pulses Eaten Whole	%	%
Brown Chickpeas	17.2	
Yellow Chickpeas	24.1	
Kidney Beans	17.2	
Laird Lentils	6.9	
Egyptian Lentils	3.4	
Black Mung Beans	13.8	
Green Mung Beans	34.5	45.5
Cowpeas (n = 11)	27.3	
Split Pulses		
Egyptian Lentils	41.4*	
Black Mung Beans	24.1	
Green Mung Beans	48.3*	
Yellow Peas	13.8	
Pigeon Peas	17.3	36.4
Oily Pigeon Peas	44.8*	63.6*

*Denotes pulses used in Dish 1 (a boiled pulse) or Dish 2 (a boiled pulse with vegetables) by more than 40% of the respondents in each group.

Dishes 1 and 2 (see Table 15 and Appendix 34). The findings indicate that respondents may use specific pulses to prepare specific dishes. It was concluded that only pulse crops which are prepared as the selected dish should be shown to respondents in background studies which are used to develop evaluative beliefs and for the questionnaire-based survey.

3.3 Evaluative Beliefs

The relevance and importance of each evaluative belief used in the questionnaire-based survey was evaluated after the survey. Comparisons were made of the numbers of missing responses for each belief, the ratings that respondents assigned to the importance of selected beliefs and the number and strength of correlations between evaluative beliefs and the frequency of consumption for the samples of crops. A total of 26 respondents did not report the evaluative beliefs they associated with the 6 pulses listed in Table 14. These pulses were also used less than once a week by consumers in Study 7. The evaluative beliefs associated with these crops were not analyzed because of the small sample size for these crops. It was concluded that cultivars which are revealed as being used infrequently by most respondents in background studies should be excluded from questionnaire-based surveys.

Respondents did not complete scales for some evaluative beliefs because the scales were "Not Applicable" to the crop sample or because the respondent "Did Not Know" the attributes of samples. Such responses were coded as missing responses. Between 5 and 19 missing responses were associated with the following evaluative beliefs: Easy to Mash, Nutritious, Easy to Sprout, Mix with Others, No Gas, Expensive, For the

Sick People, Gives Strength, (See Table 16). Comments that respondents made about these evaluative beliefs suggest several reasons for high numbers of missing responses (see Appendix 34).

Even though respondents were told to think of preparing and eating each sample as a cooked dal dish under specific conditions, respondents still commented that their beliefs about samples depended upon how they prepared the samples. Some of the evaluative beliefs were not relevant to samples of the crop tested, nor were they relevant to respondents with all types of crop consumption patterns. For example, respondents who only soaked, ground and then cooked whole black mung beans as a fermented dish (Dish 3) could not report the evaluative beliefs they associated with the practice of soaking, cooking and mashing whole black mung beans as a boiled pulse (Dish 1). This finding again emphasizes the point that only appropriate crops should be used to develop evaluative beliefs and that only those crops should then be used in the questionnaire-based survey.

The evaluative beliefs for the questionnaire-based survey were developed by asking Frequent Users and Consumers (Study 7) to indicate the advantages and disadvantages of preparing and eating 14 different pulses. They were not instructed to think of preparing the selected boiled pulse dish (Dish 1) under specific conditions (e.g. at home with members of their household in the next two weeks). In contrast, respondents for the questionnaire-based survey were instructed to think of preparing and eating all samples as a boiled pulse dish (Dish 1) under specific conditions (e.g. at home with members of their household

Table 16: Responses for Evaluative Beliefs that were Classified as Missing for Pulses that were Used Often by 8 or More of the 40 Respondents in the Questionnaire-based Survey (Study 8)

	Pulses								
Evaluative Beliefs	1	2	3	4	5	6	7	8	9
Is Tasty	1	4	0	1	1	2	3	1	2
Needs Soaking	1	3	0	3	1	2	3	1	1
Short Cook Time	2	3	0	2	1	2	3	1	1
Easy to Mash	5	5	4	5	4	3	7	3	1
Easy to Digest	1	3	0	2	1	2	5	3	2
House is Accustomed	4	3	2	3	2	3	4	1	1
Is Nutritious	3	8	1	4	3	5	5	3	2
Keeps Shape	1	3	1	3	1	2	4	1	1
Serve as Meal	1	3	0	2	1	2	3	1	1
Easy to Sprout	10	20	2	18	18	19	13	11	17
Mix With Others	4	5	1	3	2	4	3	2	2
No Gas	6	7	5	2	4	7	7	7	3
Easy to Clean	1	3	0	1	1	2	3	1	1
Is Expensive	1	5	0	2	3	3	4	15	13
Is for the Sick	7	12	5	8	6	8	9	7	6
Is for Guests	1	4	0	1	1	2	3	1	2
Is Filling	1	3	1	1	2	2	3	1	1
Gives Strength	4	10	1	2	4	5	6	6	5

Codes for Pulses:

1 = Yellow Chickpeas
2 = Split Egyptian Lentils
3 = Green Mung Beans
4 = Split Black Mung Beans
5 = Split Green Mung Beans
6 = Split Oily Pigeon Peas
7 = Cowpeas
8 = Whole Eston Lentils
9 = Split Eston Lentils

within the next two weeks). Information obtained from several background studies indicated that many dishes could be prepared from pulses (see Appendices 27-33). Findings in various studies also indicated that the crops which were shown to Frequent Users, Consumers and respondents for the questionnaire-based survey were not all prepared as the selected dish (see Appendices 29, 32, 34).

The high number of missing responses for measures of evaluative beliefs in the questionnaire-based survey indicated that not all of the evaluative beliefs were relevant for all of the crops. It was concluded that it is essential to instruct respondents to think of preparing a selected dish when evaluative beliefs are being developed in background studies for a questionnaire-based survey. It was also considered essential to develop evaluative beliefs in background studies by showing respondents only those crops which are normally prepared as the selected dish. Crops subsequently shown in the questionnaire-based survey should only be selected from this set of crops. It was concluded that the same dish should be specified when evaluative beliefs are developed in background studies and when attitudes to specific crops are being evaluated in a questionnaire-based survey.

The methods of recording respondent's comments and of permitting respondents to use "Don't Know" or "Not Applicable" responses were found to be effective ways to pretest the clarity and relevance of evaluative beliefs. The correlations between evaluative beliefs with a high number of missing responses and frequency of consumption could not be computed because of the high numbers of missing responses (see Table 16). It was concluded that the clarity and relevance of evaluative beliefs should be

determined by these methods in a background study rather than in a questionnaire-based survey. In this way, evaluative beliefs with high numbers of missing responses can be omitted from subsequent studies, and only forced choice responses (as opposed to "Don't Know" or "Not Applicable" responses) can be allowed in the questionnaire-based survey.

Not all of the evaluative beliefs that were included in the Predictive measure of crop acceptance (the measure based on the variables in the theory of Reasoned Action) were considered important by most (32 - 40) respondents (see Table 17). It was concluded that it is necessary to measure the importance of evaluative beliefs before including such beliefs in a questionnaire-based survey. Other researchers have recommended that semantic differentials be screened before they are correlated with measures of acceptance (Churchill, 1983; Osgood, 1957). The beliefs that were mentioned by most Consumers (Study 7) were not always those considered to be important by the respondents for the questionnaire-based survey. It was concluded that it is appropriate to determine the importance of evaluative beliefs in a background study rather than in the questionnaire-based survey. In this way only important beliefs can be included as measures of crop acceptance in the questionnaire-based survey (Study 8).

Correlations between evaluative beliefs and reported frequency of consumption or behavioral intention, for 10 crops that were used by most respondents, are summarized on a cultivar by cultivar basis in Table 18. Not all of the evaluative beliefs were correlated with the frequency of crop consumption or behavioral intention that was reported for these

Table 17: Numbers of Respondents Who Considered 7 Evaluative Beliefs in the Predictive Measure of Crop Acceptance to be or Not to be Extremely or Very Important (n = 40)

Evaluative Beliefs Included in the Predictive Measure of Crop Acceptance	Important	Not Important
Is Tasty (4,7)*	37	1
Needs Soaking (7)	13	19
Short Cook time (4,7)	18	9
Easy to Digest (4,7)	32	2
Easy to Mash (7)	16	10
Household is Accustomed (4)	34	2
Is Nutritious (4,7)	40	0

* Numbers in parenthesis indicate study from which evaluative belief was developed.

Study 4 = Interviews with Frequent Users
Study 7 = Interviews with Consumers

crops. Respondents considered the beliefs related to the soaking and mashing characteristics of pulses to be of the least importance. These evaluative beliefs were not correlated with reported frequency of consumption or behavioral intention at the 0.05 level of significance. Not all of the beliefs that were rated as being important were correlated with frequency of consumption. The need to pretest evaluative beliefs to determine if the beliefs are correlated with the frequency of consumption or behavioral intention for using specific crops as a selected dish was indicated by this finding.

A total of 18 of 19 significant correlations between an evaluative belief and frequency of consumption was for evaluative beliefs derived from the study of Frequent Users (Study 4). Only 5 of 19 significant correlations between an evaluative belief and frequency of consumption were derived from the study with Consumers (Study 7). It was concluded that the method of selecting evaluative beliefs from the beliefs developed by Frequent Users is a valid method for developing evaluative beliefs. It was also concluded that evaluative beliefs developed in the study with Frequent Users should be rated for importance by Consumers in Study 7, and screened for the strength of their association with frequency of consumption for the selected crops in a study such as Study 7 (the interviews with selected Consumers).

Most of the cases (13 out of 19) in which the correlation of an evaluative belief with frequency of consumption or behavioral intention was significant ($r=0.36 - 0.90$) were correlations with an evaluative belief that was included in the Predictive measure of crop acceptance (see Table 18). The Predictive measure was a measure based on concepts

Table 18: Correlation of Frequency of Consumption for 10 Pulses and Hedonic Rating for 2 Pulses with Evaluative Beliefs Associated with the Predictive and Profile Measures of Crop Acceptance

Evaluative Beliefs (Associated with the Predictive Measure)***	Correlations with Frequency of Consumption for This Pulse						
	BCh	YCh	GMu	SEg	SBMu	SGMu	SOPi
Is Tasty (1,3,4,7)	.48**	.38	.06	.50*	.15	.08	.49*
Needs Soaking (7)	.02	.07	.15	.03	.25	.03	.05
Short Cook Time (1,4,7)	.00	.29	.14	.15	.13	.13	.03
Easy to Digest (4,7)	.34	.42*	.04	.33	.40*	.03	.03
House is Accustomed (1,4,7)	.50**	.29	.20	.36	.34	.30	.52**
	n=30	n=24	n=31	n=23	n=25	n=29	n=26
Evaluative Beliefs Associated with the Profile Measure	BCh	YCh	GMu	SEg	SBMu	SGMu	SOPi
Keeps Shape (4)	.17	.23	.18	.06	.29	.18	.36
Serve as Meal (7)	.23	.28	.19	.50*	.02	.22	.37
Mix With Others (4,7)	.07	.11	.02	.30	.11	.20	.44*
Easy to Clean (4)	.18	.16	.01	.14	.12	.15	.06
For the Sick (4,7)	.25	.08	.15	.50*	.38	.04	.06
Is For Guest (4)	.33	.12	.19	.02	.06	.02	.20
Is Filling (0)	.01	.21	.32	.30	.14	.13	.17
	n=30	n=24	n=31	n=23	n=25	n=29	n=26

* sig. at 0.05 level ** sig. at 0.01 level

***(Numbers in parenthesis indicate background studies in which beliefs were identified)

Legend for Codes of Pulses:

BCh = Brown Chickpeas
YCh = Yellow Chickpeas
GMu = Green Mung Bean
SEg = Split Egyptian Lentils
SMBu = Split Black Mung Bean
SGMu = Split Green Mung Bean
SOPi = Split Oily Pigeon Pea

Table 18: Correlation of Frequency of Consumption for 10 Pulses and Hedonic Rating for 2 Pulses with Evaluative Beliefs Associated with the Predictive and Profile Measures of Crop Acceptance (continued)

Evaluative Beliefs (Associated with the Predictive Measure)***	Correlations with Frequency of Consumption for This Pulse			Correlations to 7 point Hedonic Rating for This Pulse	
	WEs	SEs	Cow	WEs	Ses
Is Tasty (1,3,4,7)	.20	.67**	.39	.40*	.90**
Needs Soaking (7)	.26	.10	.01	.05	.06
Short Cook Time (1,4,7)	.20	.01	.52**	.30	.01
Easy Digest (4,7)	.31	.08	.44*	.44*	.12
Household is Accustomed (1,4,7)	.44**	.68**	.46*	.33	.42*
	n=32	n=31	n=25	n=32	n=31
Evaluative Beliefs (Associated with the Profile Measure)					
Keeps Shape (4)	.27	.21	.35	.09	.04
Serve as Meal (7)	.07	.12	.36	.09	.30
Mix With Others (4,7)	.36*	.34	.51*	.38	.45
Easy to Clean (4)	.14	.08	.30	.06	.20
For the Sick (4,7)	.30	.00	.04	.29	.05
Is For Guest (4)	.06	.20	.44*	.00	.36*
Is Filling (0)	.04	.01	.27	.08	.08
Behavioral Intention				.63**	.67**
	n=32	n=31	n=25	n=32	n=31

* sig. at the 0.05 level ** sig. at the 0.01 level

***(Numbers in parenthesis indicate background studies in which beliefs were identified)

Legend for Codes of Pulses
- WEs = Whole Eston Lentils
- SEs = Split Eston Lentils
- Cow = Cowpeas

Legend for Codes of Studies
- Study 1 = Literature Reviews
- Study 3 = Market Observations and Interviews
- Study 4 = Interviews with Frequent Users
- Study 7 = Interviews with Consumers

included in the theory of Reasoned Action (e.g. evaluative beliefs, importance of evaluative beliefs, attitude, subjective norm and behavioral intention). The Profile measure was based only on evaluative beliefs. A set of 7 evaluative beliefs was included in the Predictive Measure. An additional 10 evaluative beliefs was included in the Profile measure. Not all of the beliefs in the Predictive or Profile measures were correlated with frequency of consumption or behavioral intention for any crop.

Consumers in Study 7 or Frequent Users in Study 4 developed all of the evaluative beliefs that were correlated with frequency of consumption (see Table 18). In this study the practice of relying on researchers to establish the evaluative beliefs to be measured in a study, as opposed to consumers (in Studies 4 and 7), provided fewer important beliefs.

Different sets of evaluative beliefs were correlated with frequency of consumption or behavioral intention that were reported for different crops. It was therefore considered valid to analyze data on the basis of each sample rather than on the basis of aggregated results for all 10 samples.

Some respondents prepared Dish 1 by cooking several samples together (see comments in Appendix 34). It was not possible for these respondents to rank such samples as being liked more or used more than other samples. Not all crops that were ranked Among or Not Among the 4 Most Liked crops were at the same time ranked as Used or Not Used Often (see Table 19). These findings indicate that different concepts were

Table 19: Results From Ranking and Open-ended Questions for Crop Consumption and Acceptance

Pulse	Percentage of Respondents who Ranked This Pulse Among: The 4 They Liked the Most		Those They Use Often		Percentage of Respondents who: Used This Pulse at Least Once a Month	
Yellow Chickpeas	15%	(6)			55%	(22)
Whole Green Mung	25%	(10)	35%	(14)	40%	(16)
Red Kidney Bean	23%	(9)			52%	(21)
Split Black Mung	13%	(5)				
Split Green Mung	33%	(13)	45%	(18)	70%	(28)
Split Oily Pigeon Pea	30%	(12)	43%	(17)	55%	(22)
Split Egyptian	23%	(9)	40%	(16)	45%	(18)

Pulse	Percentage of Respondents Who Ranked This Pulse as NOT Among: The 4 They Liked The Most		Those They Use Often		Percentage of Respondents Who Used This Pulse: Twice a Year or Less*		Never Have Used*	
Laird Lentils	90%	(36)	95%	(38)	70%	(28)	40%	(16)
Egyptian Lentils	95%	(38)	98%	(39)	70%	(28)	33%	(13)
Black Mung Bean	100%	(40)	85%	(34)	58%	(23)	25%	(10)
Red Kidney Bean			80%	(32)			10%	(4)
Brown Chickpea			85%	(34)			38%	(15)
Cowpea	85%	(34)	88%	(35)				
Split Yellow Pea	93%	(37)	85%	(34)	43%	(17)	28%	(11)
Split Pigeon Pea	83%	(33)	83%	(33)			13%	(5)

* Classes derived from open-ended question for frequency of consumption.

being measured by the two ranking questions. Not all crops that were ranked as Used or Not Used Often were also ranked as Among or Not Among the crops that respondents ate at least once a month. This indicates that samples ranked among those used often were not eaten with the same frequency. It was concluded that the open-ended question for frequency of consumption would be a more valid measure of consumption than the question for ranking crops as Used or Not Used often.

An open-ended frequency of consumption question and a behavioral intention scale were not mentioned in most of the international studies that were analyzed in the Content Analysis study (see Appendix 9). Ranking and hedonic ratings were however used in most of the 17 international studies. These measures were therefore used as standards (criterion variables) for assessing the validity of the past and future consumption that was reported by respondents (the recalled frequency of consumption and behavioral intention).

Several responses to open-ended questions about frequency of consumption were correlated with respondents ranking of their liking or use of samples and scores on the 7 point hedonic rating scales at the 0.05 level of significance (see Tables 20-21). Comparisons were made of the numbers of significant correlations between each of these measures and frequency of consumption or behavioral intention. Frequency of consumption was correlated with both ranking measures for some pulses (see Table 20).

A 7 point hedonic rating scale was more highly correlated with frequency of consumption than was rank for liking (e.g. r = 0.74 - 0.86

Table 20: Correlations Between Open-ended Measure for Frequency of Consumption, Rank for Liking and Rank for Use with Various Pulses

		Correlations for Frequency of Consumption with:		Correlation of Rank for Liking With:
		Rank for Liking	Rank for Use	Rank for Use
Whole Pulses				
Green Mung Beans	n = 39	.55**	.59**	.58**
Brown Chickpeas	n = 40	.25	.22	.39*
Yellow Chickpea	n = 37	.33*	.34*	.37*
Kidney Bean	n = 37	.26	.29	.43**
Laird Lentils	n = 27	.46*	.52*	.51*
Egyptian Lentils	n = 30	.06	.30	.05
Black Mung Bean	n = 32	.47**	.52**	.41*
Cowpea	n = 37	.18	.16	.13
Split Pulses				
Egyptian Lentil	n = 30	.58**	.60**	.40*
Black Mung Bean	n = 32	.27	.35*	.17
Green Mung Bean	n = 35	.27	.50**	.42
Yellow Pea	n = 22	.22	.62**	.40
Pigeon Peas	n = 25	.57**	.53**	.79**
Oily Pigeon Pea	n = 35	.76**	.68**	.56**

* sig. at 0.05 level ** sig. at 0.01 level

Table 21: Comparison of Correlations of Behavioral Intention (BI) and Frequency of Consumption with Other Measures of Crop Acceptance and Consumption

	Correlations (for 15 Members of Association A who Selected Split Egyptian Lentils as one of the 4 Most Liked Samples) with:		Correlations (for 20 Respondents Who Selected Split Egyptian Lentils as one of the 4 Most Liked Samples) with:	
Measure of Crop Acceptance	BI	Frequency of Consumption	BI	Frequency of Consumption
Attitude	.55*	.57*	.56**	.51*
Subjective Norm	.85**	.74**	.78**	.62**
Hedonic Rating	.88**	.86**	.85**	.74**
Rank for Liking	.47	.60*	.45*	.44*
Measure of Crop Consumption				
Frequency of Consumption (Derived from responses to open-ended question)	.90**	1.00	.80**	1.00

* sig. at 0.05 level ** sig. at 0.01 level

versus r = 0.44 - 0.60) (see Table 21). Rank for liking was therefore not considered to be as valid a measure of crop acceptance as a hedonic rating scale.

Measures of behavioral intention were also correlated to hedonic ratings (r = 0.85 - 0.88 at the 0.01 level of significance) (see Table 21). Frequency of consumption was highly correlated with both of these measures (r = 0.88 - 0.74 at the 0.01 level of significance). For these reasons categories derived from an open-ended frequency of consumption question were used as criteria for assessing the evaluative beliefs for the 16 crops in the questionnaire-based survey (Study 8).

It was difficult to analyze responses to the open-ended question for frequency of consumption because responses had to be listed, grouped and tallied to develop response categories for the question. It was concluded that a 7 point semantic differential be used in future studies to measure frequency of consumption. For example, respondents in future studies could rate frequency of consumption on a scale ranging from Extremely Often to Rarely or Never. Then the correlation between a fixed response question developed from open-ended questions for frequency of consumption and such semantic differentials could be determined to assess the validity of the semantic differential measure of crop consumption. A fixed choice question based on the categories that emerged from the open-ended questions in this study, for example, would include the following responses: Daily, 1-6 Times a Week, 2-3 Times a Month, Once a Month, 2-11 Times a Year, Less Than Twice a Year and Rarely.

The significant correlations of behavioral intention to frequency of consumption indicate that the Predictive measure of crop acceptance (the measure based on selected variables in the Theory of Reasoned Action) can be used to project crop acceptance (see Table 21). Behavioral intention, hedonic rating and frequency of consumption were all measured. However, this only applied to samples of the 4 lentils that were included in the questionnaire-based survey (Study 8) (See Table 22). The validity of using a semantic differential or open-ended question to measure consumption and to validate a behavioral intention and a hedonic rating requires further investigation with a larger sample of respondents.

The higher correlations between behavioral intention and attitude to Whole and Split Eston lentils versus the correlations for Whole and Split Egyptian lentils (r = 0.61 and 0.74 versus r = 0.13 and 0.30, respectively) suggest that respondents may be less willing to report negative attitudes for free samples of new cultivars which they have been given (see Table 22). The tendency of respondents to report inflated or overly positive scores for samples is called a halo effect. It was concluded that the attitude respondents report for new cultivars which they are given, may be higher than the respondents' actual attitude for such samples (e.g. the Eston lentils versus the Egyptian lentils in Study 8). These findings suggest that controls for halo effects should be included in future research on crop acceptance.

It was concluded that halo effects should be controlled by measuring only importance of evaluative beliefs and ethnic and crop consumption attributes of consumers during the first interview of the

Table 22: Correlation of Behavioral Intention with Attitude (A), Subjective Norm (N), and 7 point Hedonic Rating (HED).

Pulse		Correlation of Behavior Intention to			Correlation of Hedonic Rating to	
		A	SN	HED	A	SN
Whole Egyptian Lentil	n=20	.13	.14	.54*	.25	.66*
Split Egyptian Lentil	n=25	.30	.81**	.54**	.62**	.64**
Split Eston	n=33	.74**	.77**	.69**	.56**	.84**
Whole Eston	n=32	.61**	.74**	.73**	.82**	.73**

* sig. at 0.05 level ** sig. at 0.01 level

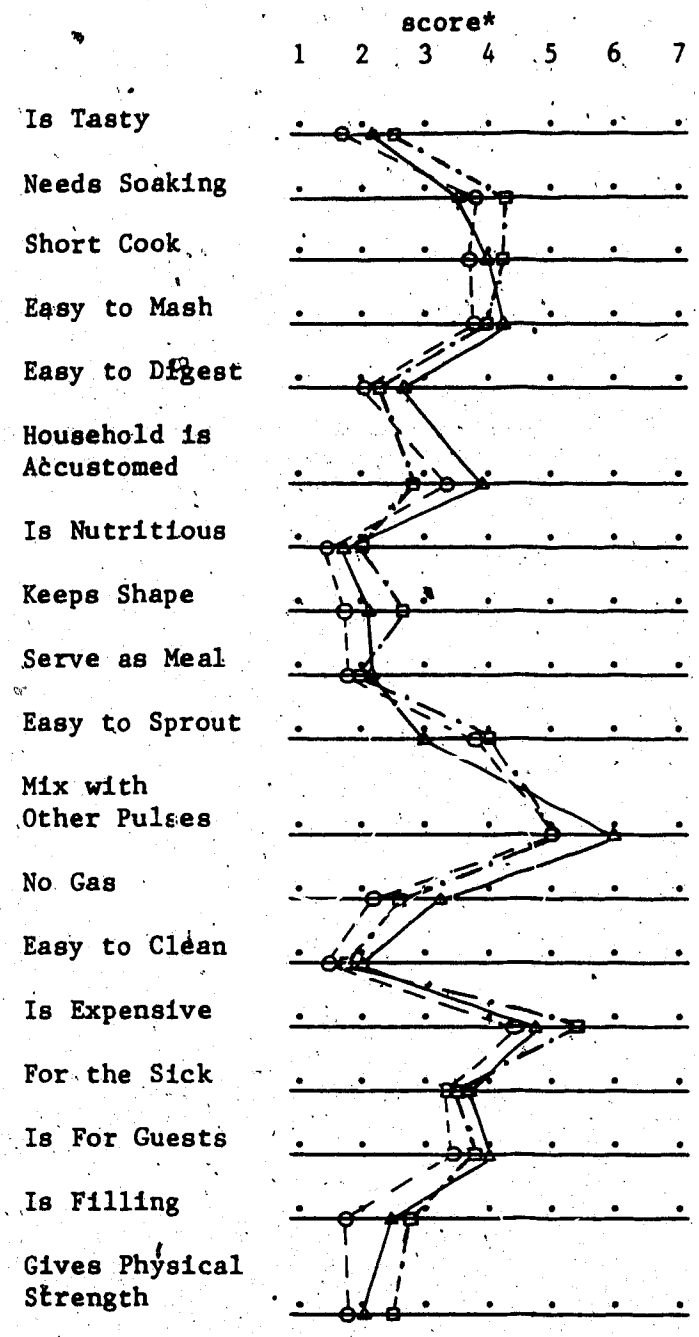
questionnaire-based survey (Study 8). A measure of the evaluations of outcomes of behavioral beliefs and all other questions on behavioral beliefs, attitudes, subjective norms and behavioral intentions would then be asked during the follow-up interview of such a survey (Study 8). In this way, measures of acceptance of new cultivars could be obtained by showing respondents all 16 samples in one of at least 2 sequences during the second interview. This method places less emphasis on the samples that respondents are given. Halo effects may also be reduced by having a member of the community, rather than the researcher, conduct the interviews.

It was more convenient to compare the Image Profiles of evaluative beliefs that consumers associate with samples than to compare the mean values for the evaluative beliefs. For example, in this study, the Image Profiles for Split and Whole Eston lentils were similar to those for Split and Whole Egyptian lentils (see Figures 1 and 2). The Image Profile for Laird lentils was also similar to that for the Whole Egyptian lentils (see Figure 1). The Image Profiles provided more information about respondents' perceptions of pulses than the Predictive measure of crop acceptance, because more evaluative beliefs could be included in the profile. The Predictive measure of crop acceptance related best to crop consumption however.

It was concluded that a more extended assessment of the benefits of using Image Profiles to measure crop acceptance can be made by doing a factor analysis of important evaluative beliefs associated with past frequency of consumption, behavioral intention or hedonic rating scores.

Figure 1: Image Profile Representing Attitudes to Whole Lentils

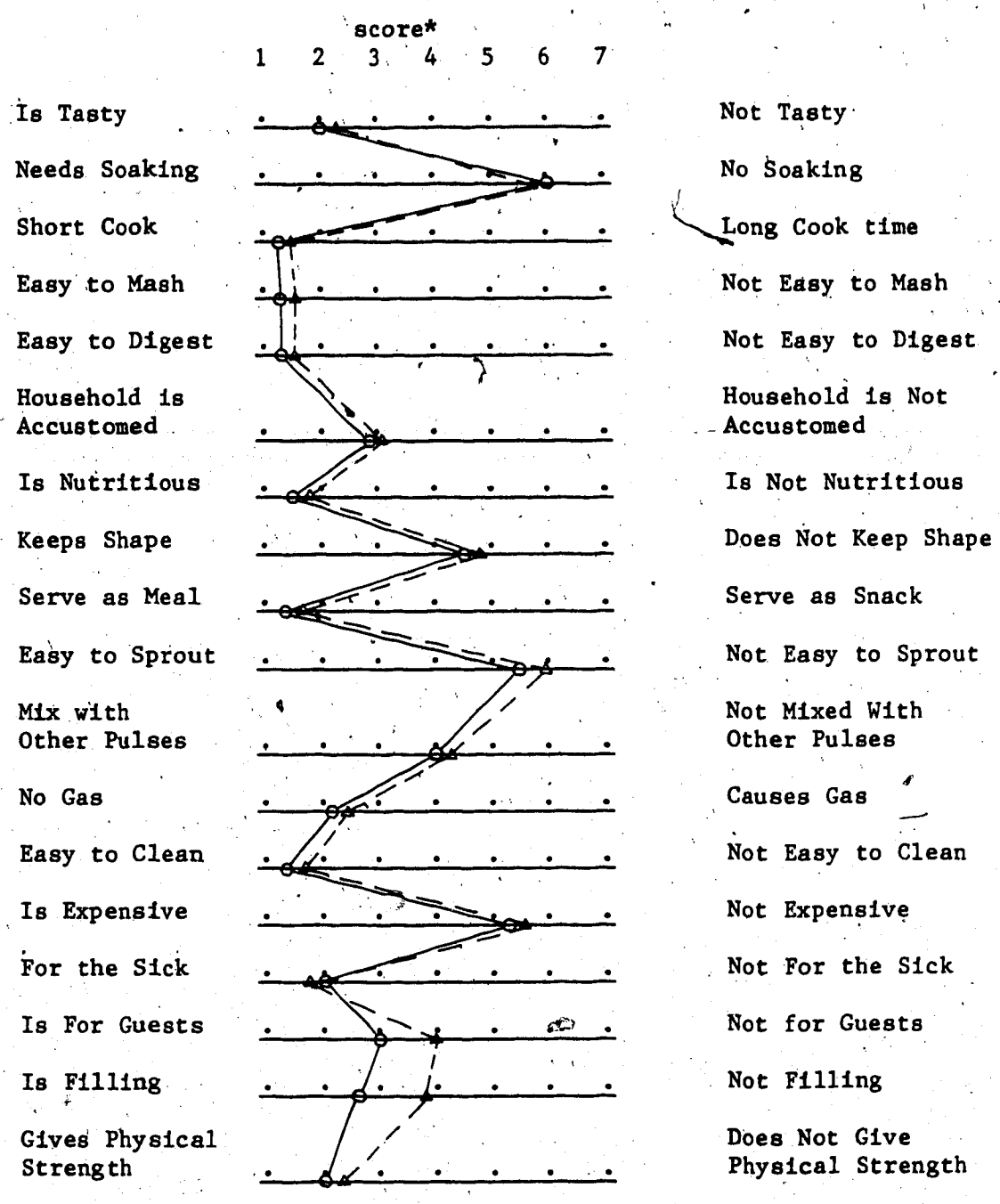
-o- - -o- =Eston Lentils (n = 25-39)
-□-·-□- =Egyptian Lentils (n = 17-27)
-△——△- =Laird Lentils (n = 19-24)



* Scores represent the mean response for the evaluative beliefs. See Appendix 26 for detailed expressions of evaluative beliefs that were used in Study 8, the questionnaire-based survey.

Figure 2: Image Profile Representing Attitudes to Split Lentils

—o—o— =Split Eston Lentils (n = 23-39)
—Δ--Δ— =Split Egyptian Lentils (n = 23-37)



* Scores represent the mean response for the evaluative beliefs. See Appendix 26 for detailed expressions of evaluative beliefs that were used in Study 8, the questionnaire-based survey.

Such an analysis would however require a large number of respondents. Such a study should only include crops which are prepared as the selected dish and evaluative beliefs that have been screened by the methods recommended earlier.

3.4. Other Measures of Crop Acceptance

The mean scores for the evaluative beliefs about suitability for serving to guests or the extent to which the household is accustomed to the pulse were significantly correlated for only 2 of 10 samples (see Table 23). Different mean scores for these evaluative beliefs were obtained for different pulse samples (see Table 24). Since only members of the respondent's family were present for most meals, these findings indicate the necessity of specifying with whom a pulse dish is eaten when respondents are asked to report their evaluative beliefs for selected crops. Since selected concepts in the theory of Reasoned Action were correlated with frequency of consumption and hedonic rating, the theory was considered a valid framework for this research on crop acceptance (see Table 21). Measures of behavioral intention were more highly correlated with frequency of consumption ($r = 0.90 - 0.80$) than the 7 point hedonic rating scales ($r = 0.86 - 0.74$) in this study.

It was concluded that an action rating scale, such as behavioral intention, was a better measure of crop acceptance than a hedonic rating scale. This conclusion was also reached by other food acceptance researchers (Meiselman, 1984; Cardello and Maller, 1983; IFT, 1981; Pilgrim, 1961).

Table 23: Correlation of Evaluative Belief "Is For Guest" with Evaluative Belief "Household is Accustomed"

Pulse		
Black Chickpea	n=30	.18
Yellow Chickpea	n=24	.10
Green Mung Bean	n=31	.17
Split Egyptian Lentils	n=23	.26
Split Black Mung Beans	n=25	.09
Split Green Mung Beans	n=29	.06
Split Oily Pigeon Peas	n=26	.52**
Cowpea	n=25	.63**
Whole Eston Lentils	n=32	.16
Split Eston Lentils	n=31	.18

** sig. at 0.01 level

Table 24: Mean Scores and Standard Deviation of Mean Scores for 2 Evaluative Beliefs Associated With 10 Pulses

Pulse	Evaluative Beliefs: Household is Accustomed			Is For Guests		
	n	Mean	St. Dev.	n	Mean	St. Dev.
Black Chickpea	39	2.8	(2.3)	40	2.3	(1.8)
Yellow Chickpea	36	2.1	(1.7)	39	1.5	(0.88)
Green Mung Bean	38	1.7	(1.5)	40	2.6	(1.9)
Split Egyptian Lentils	37	3.1	(2.4)	36	4.4	(2.4)
Split Black Mung Beans	37	2.6	(2.3)	39	2.9	(2.4)
Split Green Mung Beans	38	1.7	(1.7)	39	3.5	(2.5)
Split Oily Pigeon Peas	37	2.0	(1.8)	38	2.7	(2.1)
Cowpea	36	3.0	(2.4)	37	2.8	(2.1)
Whole Eston Lentils	39	3.0	(2.3)	39	3.3	(2.5)
Split Eston Lentils	39	3.1	(2.6)	38	3.1	(2.3)

1 = extremely accustomed or extremely likely to serve to guests

7 = extremely unaccustomed or extremely unlikely to serve to guests

CHAPTER VII

CONCLUSIONS AND IMPLICATIONS

1. Conclusions

The methodology for this research was developed from a content analysis of 17 international studies on research of the consumer acceptance of crops in developing countries. The methodology included several concepts and methods that were not mentioned in the 17 international studies. These concepts and methods appear in bold-faced print in Appendices 4-11 and were discussed in pages 32 to 39. The methodology also included a series of background studies, the results of which were required to design a comprehensive questionnaire-based survey (see Table 11). Conclusions about and implications of the concepts and methods that were included in the methodology, and about the background studies and questionnaire-based survey are discussed in this chapter.

1.1. Concepts and Methods

The findings of this research indicate that all of the concepts and all methods except for the Repertory Grid Technique are appropriate for research on the consumer acceptance of crops. It was found that the concepts in the theory of Reasoned Action are a valid theoretical framework for research on the consumer acceptance of crops. In practice this implies that cultivars must be shown not simply named, and that the same conditions for using the cultivars must be specified to measure all concepts included in the theory. It is necessary to measure consumer

acceptance rather than preference for crops by this methodology. It is also preferable to develop evaluative beliefs by the procedures used with Frequent Users (Study 4) rather than those used with Consumers in Study 7 (see Appendices 16 and 27, respectively). It was not possible to use the Repertory Grid Technique described in Appendix 17.

It is necessary to select a culturally diverse sample of consumers for research on the consumer acceptance of crops in countries with a culturally diverse population. In this study it was possible to obtain such a sample of consumers in one community by using ethnic and geographic criteria (e.g. place of birth, languages spoken and generation of migration to the selected community). Research for the 17 international studies that used culturally diverse samples of respondents, was not done in one community. It appears that management and travel costs for research on the consumer acceptance of crops in such studies may be reduced by following the sampling methods that were developed in this research.

It is necessary to use ethnic and geographic criteria to select respondents for the questionnaire-based survey and other background studies. This ensures that respondents are representative of a range of ethnic groups. For the same reason, it is also necessary to use representative ethnic and geographic criteria to select the samples of literature, cookbooks, markets and restaurants that are included in other background studies.

A methodology designed to measure the consumer acceptance of crops should include questions that measure the crop consumption and cultural

attributes of respondents so that the interactions between these variables and crop acceptance can be determined. Behavioral beliefs, evaluations of the outcomes of such beliefs, attitudes, behavioral intention and subjective norm (as defined by Ajzen and Fishbein, 1980) should also be measured by such a methodology. The data analysis method described by these researchers may then be implemented.

Questions with various response formats (e.g. open-ended, ranking and semantic differential scales) should be used in the methodology. Open-ended questions are required in background studies to develop a fixed response question for the frequency of crop consumption. Attitudes and behavior should be measured with ranking questions and semantic differential scales. Ranking types of questions provide a means of putting respondents at ease and are useful in background studies and a questionnaire-based survey.

It was shown in this research that when respondents were asked to rank more than three samples, the resulting responses are less valid than responses reported on scales such as semantic differentials. More than three crops were evaluated in most of the 17 international studies that were included in the Content Analysis. It is important, therefore, to include scales such as semantic differentials in studies of the consumer acceptance of crops. Such scales provide data which may be analyzed subsequently for significance of differences in correlations between these measures.

Evaluative beliefs in a questionnaire-based survey should be validated by correlating them with a 7 point hedonic rating scale and a measure of crop consumption. Further research is necessary to identify

the more appropriate standard (criterion variable). Evaluative beliefs can be validated by correlating them to a category measure for frequency of consumption, a 7 point semantic differential for frequency of consumption and (or) a behavioral intention scale. Measures to be correlated should be done for all crops that are included in the questionnaire.

Both Predictive and Profile measures of crop acceptance should be included in research on the consumer acceptance of crops. The Profile measure provides a method for determining the relevance and importance of evaluative beliefs. This should be carried out in a background study. Important behavioral beliefs should be included in the Predictive measure. The Predictive measure should be carried out in the questionnaire-based survey.

In the analysis of data it is preferable to analyze data on the basis of individual cultivars rather than on the aggregated results for all crops. Similarly, correlations between crop acceptance and consumption that are reported for consumers in different ethnic and crop usage groups yield more useful conclusions than correlations among an aggregated sample of consumers.

This discussion of the necessity for including concepts and methods, identified by doing a content analysis of 17 international studies, indicates that all of the identified concepts and all of the identified methods, except the Repertory Grid Technique, are necessary components of a methodology for measuring the consumer acceptance of crops.

1.2 Background Studies and Questionnaire-based Survey

The results of this research indicate that it is necessary to do a range of background studies. Background studies are required to identify the Cultivars, Consumers, Conditions for Using Crops and Evaluative Beliefs that should be included in a questionnaire-based survey of the consumer acceptance of crops. The background studies tested in this research provided essential information about these topics. Information about the importance of evaluative beliefs, the types of normative beliefs and the importance of normative beliefs should be collected from Frequent Users and Consumers in Studies 4 and 7. It is recommended that information on the importance of evaluative beliefs be collected in the study with Consumers and that information on the normative beliefs be collected from Frequent Users. This information should also be added to the list of information that is collected in background studies (see Appendix 13).

Several limitations of the background studies and questionnaire-based survey were highlighted in the discussions of results for this research (see Chapter VI). To overcome these limitations it is recommended that these studies be done in the following sequence shown:

Step 1: Interviews with Public Officials

Step 2: Review of Literature and Cookbooks

Step 3: Observations and Interviews in Markets and Restaurants

Step 4: Interviews with Frequent Users

Step 5: Interviews with Consumers

Step 6: Questionnaire-based Survey

To facilitate the comparison of information that is collected in background studies it is recommended that the questions in such studies should be coded according to the listed topics in Appendix 13 before, rather than after, the information is collected.

It is recommended that the first background study to be done is the Interviews with Public Officials, since the information obtained in such a study is required for all subsequent studies. The researcher needs the assistance of public officials to:

a) obtain samples of the new cultivars which will subsequently be evaluated for consumer acceptance,

b) determine the names and appearance of cultivars of the selected crop and of crops in the selected category,

c) select ethnic and geographic criteria that will be used to assess the representativeness of information sources that are used in other studies, and

d) generate a list of other public officials (such as home economists, nutritionists, leaders of formal and informal associations), literature, cookbooks, retailers and restaurants that will be sampled in subsequent background studies.

Home economists with a specific knowledge in the area under study were a rich source for information related to food consumption practices in this research. It is thus recommended that home economists and officials in nutrition institutes, in addition to marketing officials in agricultural extension agencies, be asked the questions in Appendix 14 that relate to food consumption practices.

It is recommended that the second study in the methodology be a review of both the literature and cookbooks. Information from such a review is required in subsequent studies to:

a) establish a standard set of botanical and English names for crops in a selected category,

b) assess the validity of the ethnic and geographic criteria that were selected by interviewing the public officials,

c) develop an awareness of the conditions for preparing and eating the selected crops,

d) develop an awareness of names for dishes and procedures for preparing dishes from crops (in the selected category and from other cultivars of the selected crop), and

e) develop an awareness of the evaluative beliefs associated with these crops.

Information that is obtained by this review should be c[illegible]d as it is collected. This makes it easier to compare these findings with those obtained in other background studies.

The review of literature and cookbooks should be followed by observations and interviews in markets and restaurants. Information obtained in this way is required for the remaining studies in the methodology for this research. This information is necessary to establish a standard set of:

a) samples of the selected crops,

b) pictures of dishes that are prepared from those crops and

c) local names for the selected crops and dishes prepared from those crops.

The procedures outlined in Appendices 15 and 20 were necessary to obtain this informatic . If the market and restaurants do not cater to consumers with the same ethnic and geographic characteristics that are used to select consumers in subsequent studies of the methodology, it is recommended that samples of the selected crops and dishes prepared from

those crops be obtained from Frequent Users who represent such consumers.

The design and interpretation of results from Interviews with Frequent Users requires information that is obtained from public officials, literature, cookbooks, markets and restaurants. Information obtained by interviewing Frequent Users is however required to design the interviews with consumers and questionnaire-based survey. It is recommended, therefore, that the Interviews with Frequent Users follow the market and restaurant observations and precede the Interviews with Consumers and the questionnaire-based survey.

Information obtained by interviewing Frequent Users is required to:

a) establish the conditions and dishes that will be specified in subsequent studies (interviews with Consumers and questionnaire-based survey),

b) select the crops that will be shown to develop evaluative beliefs related to a selected dish,

c) develop a list of evaluative beliefs, and

d) determine the clarity and relevance of evaluative beliefs.

To increase the validity of reported frequency consumption, it is recommended that Frequent Users be asked to identify samples of crops. The Frequent Users should be corrected if names they mention differ from those selected during the market observations. This will reduce the types of response errors that were experienced in this research for the development of the methodology. The methods used in this research to ask Frequent Users to generate evaluative beliefs did not relate to the preparation of crops as a specific dish (see Appendix 16, question 7).

Many evaluative beliefs that were developed in this research were therefore not clear.

It is recommended that the pictures that are shown to Frequent Users include examples of all types of dishes that are prepared from the selected crop. This can limit the incidence of response errors that were discussed in the previous chapter (see Chapter VI). During the interview, Frequent Users should be shown pictures of dishes and asked to provide names of any dishes that they prepare that look like the dishes in the pictures. The respondents should also be requested to indicate the crop samples that they normally use to prepare each of these dishes. The procedures in Appendix 25 (for questions 3-6) can be used for this purpose. These measures should overcome limitations of the methods that were used to develop evaluative beliefs with Frequent Users and Consumers in Studies 4 and 7 for this research.

Frequent Users should report how frequently they prepare each dish and each crop as a selected dish by answering open-ended questions and using semantic differential scales (see Appendix 1). A picture of the dish that is most frequently prepared by Frequent Users should then be used in subsequent questions of the interview with Frequent Users (see procedures for question 9 in Appendix 25.) In this way only crops which are normally used to prepare a specific dish will be shown to develop evaluative beliefs to be used in the interviews with Consumers and the questionnaire-based survey. It follows that more appropriate evaluative beliefs will be developed by this procedure.

Information obtained from Interviews with Consumers is required to:

a) determine the clarity of evaluative beliefs that were generated by Frequent Users,

b) determine the importance of the same evaluative beliefs,

c) develop response categories for frequency of consumption,

d) determine the correlation of individual evaluative beliefs with behavioral intention, hedonic scores and scores on a frequency of consumption scale,

e) develop a question for measuring subjective norm, and

f) develop Image Profiles of the evaluative beliefs associated with the preparation of selected crops as a selected dish.

Reliability of responses should be determined by interviewing a total of 10% of the consumers that are interviewed in this study, by the same procedures six or more weeks after the original interviews. Fatigue errors should be controlled by presenting crops and evaluative beliefs in at least 2 sequences. At least 30 consumers should be interviewed so that a Student's T test may be used to determine the significance of differences in the correlations between various evaluative beliefs and other measures of crop acceptance and consumption. Semantic differentials designed to measure evaluative beliefs, hedonic scores, behavioral intention scores and frequency of crop consumption scores should be included in interviews. In this way, correlations between these variables can be determined. The methods that were used to analyze data from the questionnaire-based survey done in this research should be used to screen evaluative beliefs for clarity, relevance, importance and validity. Evaluative beliefs that were scored by most respondents, as opposed to being given a "Don't

Know" and "Not Appropriate" response can be included subsequently in a questionnaire-based survey.

It is recommended that information obtained from the questionnaire-based survey be used to:

a) determine the relationship of evaluative beliefs to other measures of crop acceptance and consumption (hedonic, past frequency of consumption, behavioral intention and attitude scales)

b) and to examine these relationships within groups of consumers from different ethnic and crop consumption groups.

It is recommended that respondents only be shown pictures of the crops and dish that were selected by interviewing Frequent Users. Respondents should be asked to identify the crops and dishes and they should be corrected if they incorrectly identify any of them. Halo effects should be controlled by giving respondents a sample of the new cultivar during the first interview. Measures of acceptance for all the selected crops, including the cultivar, should be done in the follow-up interviews. Interviewers should be members of the community where the study is conducted. Fatigue effects should be controlled by developing more than one sequence for presenting samples and evaluative beliefs in the follow-up interview. A total of 10% of the respondents should repeat the two interviews to assess the reliability of responses. In this research it was possible to validate acceptance responses by correlating evaluative beliefs to a measure of attitude. It was possible to validate behavioral intention by correlating behavioral intention to a frequency scale for past level of consumption. Validity of measures of consumption should be determined by correlating category

responses for frequency of consumption to semantic differentials scores for frequency of consumption.

2. Implications

In this research it has been shown that consumers' evaluations of crops can be used to develop effective evaluative beliefs for questionnaire-based surveys on the consumer acceptance of crops. The methodology used in this research arose from social science and consumer behavior concepts. It is evident that home economists and other researchers who wish to use this methodology need to understand how to use basic concepts and methods for measuring and analyzing food (and crop) acceptance and consumption data. Initially it may be necessary to offer workshops through international agricultural research centres or the extension services of national universities to introduce researchers interested in crop improvement to concepts and methods for measuring attitudes and behaviors. In the long run, the possibility of including courses related to social science and consumer behavior research methods within home economics, food science, agricultural or rural economy programs at training institutions, such as national universities in developing countries, should be considered.

The findings of this research indicate that crops that are acceptable to consumers can be identified by using research methods that have been validated for use in consumer acceptance studies. The methodologies developed in this research could also be used to monitor the acceptance of currently available crops as well as new cultivars. The implementation of such research as an integral part of crop

improvement programs has the potential to reduce the cost of research in the long run by providing another screening component in cultivar selection. Such research can be used to determine the acceptability of existing cultivars to consumers with various ethnic and crop consumption attributes.

Consumer acceptance of pulse crops can be satisfactorily determined by the methodology developed in this research. It should be possible to extrapolate this method to study cereal crops. This extrapolation is believed possible because cereals, like pulses, are a low moisture food grain which in many countries are purchased as a whole grain and subsequently processed in the home. It is therefore both possible and appropriate to show raw (unprocessed) samples of cereals to consumers rather than processed components of grain (such as flour).

The compositional, functional and sensory attributes of cultivars which are acceptable to consumers can subsequently be determined by chemical, physical (instrumental) and sensory methods. Data from these measures can be used as standards for selecting or rejecting new cultivars at various stages in a crop improvement program. Studies of the consumer acceptance of crops would provide information which could be used by policy makers to develop and distribute crops which match the standards of various groups of consumers for crop acceptance. Such decisions could provide for the more efficient and effective operation of markets and crop improvement programs.

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Appendix 1: List of Titles, Locations and Researchers of International Studies

Title	Location	Researcher
Post-Harvest Technology in Senegal Current Practices and Future Needs	Senegal	Yaciuk and Yaciuk, (1983)
A Survey on Eating Habits in Ten Villages-Khon Kaen Province Northeastern Thailand	Thailand	Ngarmsak and Earle, (1982b)
Kisra Quality: Testing New Sorghum Varieties and Hybrids	Sudan	Ejeta, (1981)
Use of Sorghum as Food in Southern Honduras	Honduras	Futrell, (1981)
Sorghum Roti: I. Traditional Methods of Consumption and Standard Procedures for Evaluation	India	Murty and Subramanium, (1981)
Varietal Preference, Marketing, Storage, Processing and Utilization of Sorghum and Millets in Andhra Pradesh	India*	Pushpamma and Vogel, (1981)
Sorghum Alkali To: Quality Considerations	Mali*	Scheuring et al., (1981)
A Market-Derived Selection Index for Consumer Preferences of Evident and Cryptic Quality Characteristics of Sorghum	India	Von Oppen and Rao, (1981)
New Food Product "Pearl Dura"	Sudan	Badi, (1980)
Boiled Sorghum Characteristics and Their Relationship to Starch Properties	India	Subramanium et al., (1980)

Appendix 1: List of Titles, Locations, and Researchers of International Studies (continued)

Title	Location	Researcher
Traditional Methods of Processing of Sorhgum (Sorghum Bicolor) and Pearl Millet (Pennisetum Americanum) Grains in India	India*	Subramanium and, Jambunathan, (1980)
Summary of Results from Indebix Survey (1979)	Ethiopia	Vogel and Kerrsie,
Consumer Preferences Study on Sorghum	Botswana*	Eisener and McFarlane, (1977)
Preferences for Cowpea Varieties in the Volta Region of Ghana	Ghana*	Dovlo, (1975)
Consumer Preference Study for Cowpeas in Maiduguri (1974)	Nigeria	Smirl and Zoaka,
Consumer Preference Study in Grain Utilization, Maiduguri, Nigeria (1974)	Nigeria	Steckle and Ewanyk,
A Preliminary Study of Consumer Preferences in the Choice of Cowpeas-Western and Kwara States Headquarters and Areas of Nigeria	Nigeria	Williams, (1974)

*Studies re-analyzed to test reliability of Content Analysis Study.

Appendix 2: Description, Diagram, Requirements and Limitations of the Theory of Reasoned Action (Ajzen and Fishbein, 1980; Engel and Blackwell, 1982)

The theory of "Reasoned Action" is based upon the assumption that a behavioral intention (BI) is an approximation of actual future behavior (B). A behavioral intention is the result of empirically weighted effects of a person's attitude (A) and subjective norm (SN) in reference to the person's own action of performing an object-related action.

Attitude is the respondent's overall "feeling of favorableness or unfavorableness" about the consequences of the person's own performance of the object-related action. Attitude is based upon the sum of all importance-weighted behavioral beliefs (b) that the person uses to evaluate an object-related action. The importance of each behavioral belief is accounted for by the person's evaluation (e) of the consequences of a behavioral outcome. Thus an outcome evaluation (e) is a rating of the certainty with which a person believes that an object-related action will result in a specified consequence.

The subjective norm is the sum of a respondent's normative beliefs (NB). Before the scores of all of the normative beliefs are added together, each is weighted for importance according to the respondent's motivation to comply (MC) with each belief. Normative beliefs are a result of a respondent's perceptions about whether or not "important others" think the respondent should or should not perform a specified object-related action. "Important others" are people whose opinions the respondent values. The respondent's self-reported motivation to comply with each normative belief indicates the importance the respondent attaches to doing what the respondent believes specific "important

Appendix 2: Description, Diagram, Requirements and Limitations of the Theory of Reasoned Action (Ajzen and Fishbein, 1980; Engel and Blackwell, 1982) (continued)

others" think the respondent should or should not do in reference to the object-related action.

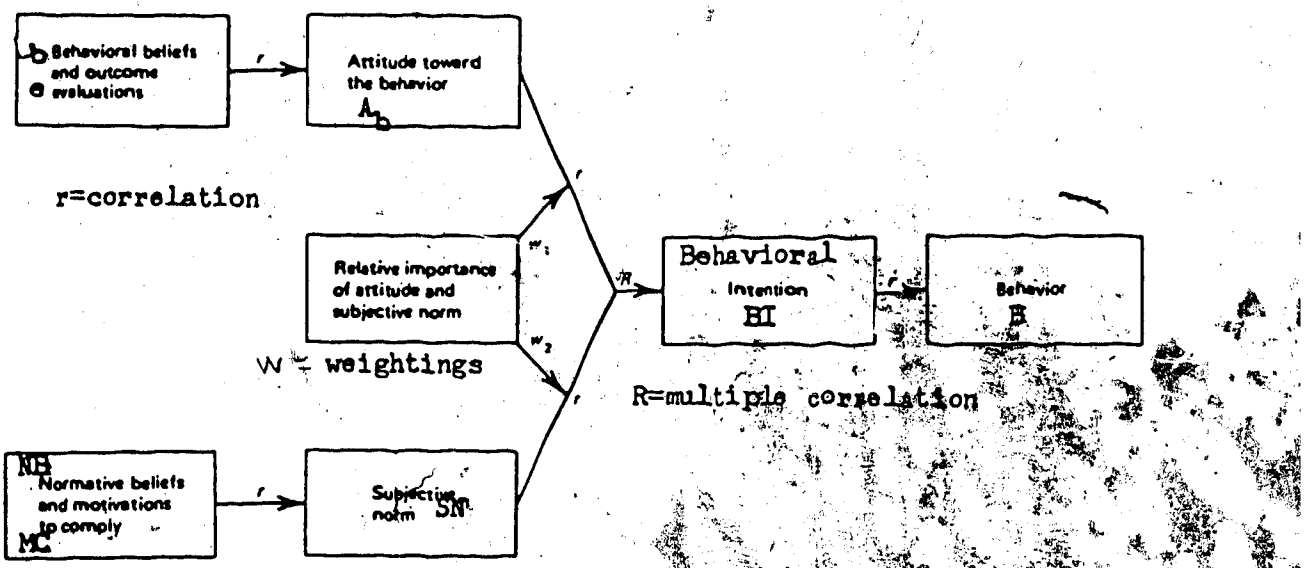
Appendix 2: Description, Diagram, Requirements and Limitations of the Theory of Reasoned Action (Ajzen and Fishbein, 1980; Engel and Blackwell, 1982) (continued)

DIAGRAM OF THEORY OF "REASONED ACTION"

$$B \quad BI = A_b \cdot w_1(\text{weighted}) + SN \cdot w_2(\text{weighted})$$

$$A_b = \text{sum of } b_1e_1 + b_2e_2 \ldots b_ne_n$$

$$SN = \text{sum of } NB_1MC_1 \ldots\ldots NB_nMC_n.$$



Relations among beliefs, attitude, subjective norm, intention, and behavior.
(from Ajzen and Fishbein, 1980)

Appendix 2: Description, Diagram, Requirements and Limitations of the Theory of Reasoned Action (Ajzen and Fishbein, 1980; Engel and Blackwell, 1982) (continued)

REQUIREMENTS AND LIMITATIONS OF THE THEORY OF REASONED ACTION

(Derived from Ajzen and Fishbein, 1980)

a. Measurements should be made on object-related action not simply objects.

b. Measurements should, if possible, be obtained from direct exposure to the objects of an object-related action.

c. The conditions (behavioral elements) for measures of all concepts in the theory should correspond. Different conditions should not be used to measure attitudes, subjective norm, behavioral intention and behaviors.

d. Action, target, context and time are the four conditions (behavioral elements) of behaviors. Behavior is "acted upon" a target. The action and target occur within a context and time. For example, an individual behavior may be defined as the act of purchasing (action) lentils (target) in a health food store in Edmonton (context) on a Monday (time).

SUMMARY OF LIMITATIONS OF THE THEORY OF REASONED ACTION

(Derived from Ajzen and Fishbein, 1980; Engel and Blackwell, 1982)

a. To date there is no direct evidence of the validity of the component weights (w) (see diagram of theory).

b. There is no assurance that the effect of unanticipated circumstances is accurately reflected by A (attitude).

c. There is no assurance that an evaluation is the result of averaging rather than adding all important beliefs.

d. The measurement of motivation to comply (MC), subjective norm (SN) and normative beliefs (NB) is altered by the wording of questions used to measure these concepts.

APPENDIX 3: Results of Content Analysis Study and Form for Recording Classification of Practices and Concepts in 17 International Studies (Final Version)

Study Number:
Author:

Practices	Results*	Classification Codes	Other Comments
TYPE	17		
PURPOSE	17		
STATEMENT OF PROBLEM			
Information Cited			
Consumer Groups	11		
Crop Varieties	11		
Crop Usage			
Processes	6		
Ingredients	15		
Products	8		
Other			
Information Source	13		
Validity	2		
Other			
SAMPLE			
Unit	16		
Size	15		
Frame	16		
Selection Method	11		
Other	3		
FORMS			
Type	17		
Length	9		
Content			
Language	8		
Attitudes			
Evaluative Beliefs	17		
Unit	16		
Measurement Level	16		
Question Type	13		
Scale Type	12		
Other			
Behavior			
Type	12		
Unit	12		
Measurement Level	12		
Measurement Techniques	12		
Other			

*Numbers in appendix indicate number of International Studies classified in the designated categories.

APPENDIX 3: Results of Content Analysis Study and Form for Recording Classification of Practices and Concepts in 17 International Studies (Final Version) (continued)

	Results*	Classification Codes	Other Comments
Other Consumer Attributes	10		
Other			
Pretesting			
Respondents	6		
Interviewers/Technicians	1		
Methods	2		
Other			
Other			
COLLECTION of Data			
Time	6		
Duration	3		
Location	11		
Situation	5		
Interviewers/Technicians	7		
Other Researchers	3		
Other			
ANALYSIS of Data			
Consumer Groups	10		
Frequency	13		
Central Tendency	8		
Reliability	4		
Validity	5		
Statistical Tests	6		
Errors	2		
Other			
RESOURCE CONSTRAINTS			
Materials	2		
Human	2		
Other			
Concepts			
THEORY MENTIONED	1		
CONCEPTS MENTIONED	17		
EXPOSURE STIMULUS			
Unit	16		
Situation	16		
Cue Form	17		
Cue Involvement	15		
Other			

*Numbers in appendix indicate number of International Studies classified in the designated categories.

APPENDIX 3: Results of Content Analysis Study and Form for Recording Classification of Practices and Concepts in 17 International Studies (Final Version) (continued)

	Results*	Classification Codes	Other Comments
CONDITION			
Target	12		
Action	11		
Time	7		
Context			
Where	4		
With Whom	3		
Why	6		
Other			
Other			
SOURCE OF SELECTED EVALUATIVE BELIEF OR BEHAVIOR	4		
OTHER COMMENTS			

*Numbers in appendix indicate number of International Studies classified in the designated categories.

APPENDIX 4: Classifications of Exposure Stimuli Used with Questions About Attitudes in 17 International Studies

Categories for Exposure Stimuli	Number of Studies Classified in This Category
Unit*	
Specific Crop	7
Specific Food	7
General Crop Category	5
General Food Category	4
Situation*	
Crop Object	7
Food Object	9
Crop-Related Action	9
Food-Related Action	5
Cue Form	
Word	10
Picture	x
Model	1
Sample	10
Cue Involvement	
Hear	8
See	8
Read	x
Taste	5
Use	1

*More than one option of this category was mentioned in individual studies.

"x" denotes this category was NOT mentioned in the studies.

Note: Categories in bold-faced print were selected for methodology being developed to measure the consumer acceptance of crops in this study.

APPENDIX 5: Classifications of Conditions for Using Exposure Stimuli (eg. crop) in 17 International Studies

Categories for Conditions	Number of Studies Classified in This Category
Target*	
Raw Crop	10
Ingredient	4
Product	4
Action*	
Use	9
Use For a Specific Product	8
Buy	2
Time (of day, year)*	6
Context	
Where	4
With Whom	2
Why (eg. meal, snack)	5

*More than one option of this category was mentioned in individual studies.

Note: Categories in bold-faced print were selected for methodology being developed to measure the consumer acceptance of crops in this study.

APPENDIX 6: Classifications of the Type of Research, Purpose of Research, and Source of Selected Evaluative Beliefs in 17 International Studies

Categories for Type of Research	Number of Studies Classified in This Category
Interview	9
Laboratory Experiment	5
Field Research	3
Other (e.g., documentary research, field experiment, self-administered survey, secondary analysis)	x

Categories for Purpose of Research	Number of Studies Classified in This Category
Exploratory	2
Descriptive	13
Explanatory	2

Categories for Source of Selected Evaluative Beliefs	Number of Studies Classified in This Category
Researcher	1
Consumers	1
Researchers and Consumers	2

"x" denotes category was NOT mentioned in the studies.

Note: Categories in bold-faced print were selected for methodology being developed to measure the consumer acceptance of crops in this study.

APPENDIX 7: Classifications of Problem Statements in 17 International Studies

Categories for Problem Statements	Number of Studies Classified in This Category
Information Cited*	
Kinds of Consumer Groups	10
Number of Consumers/ Consumer Group	2
Kinds of Crop Varieties	8
Source of Crops (eg. local, import)	x
Number of Crops/Crop Variety	5
Kinds of Processes Used	6
Importance of Process	x
Kinds of Ingredients Used	1
Quantity Used/Ingredient	x
Kinds of Products Used	8
Quantity Used/Product Type	2
Information Source*	
Literature	10
Observation	7
Other (eg. interviews, scales, tests.)	x
Validity of Information	2

*More than one option of this category was mentioned in individual studies.

"x" denotes categories NOT mentioned in the studies.

Note: Categories in bold-faced print were selected for methodology being developed to measure the consumer acceptance of crops in this study.

APPENDIX 8: Classifications of Sample Used in 17 International Studies

Categories for Sample	Number of Studies Classified in This Category
Unit	
Individual	10
Aggregate	7
Size	
Less than 10	4
50-100	4
101-1000	5
1001-3000	2
Frame	
Geographic	13
Socio-economic	1
Demographic	1
Selection Method	
Probability	1
Non-probability (eg. quota, accidental, purposive)	10

Note: Categories in bold-faced print were selected for methodology being developed to measure the consumer acceptance of crops in this study.

APPENDIX 9: Classification of Data Collection Forms Used in 17 International Studies

Type*	
Questionnaire	11
Interview Guide	1
Objective Scale (Test)	5
Length (eg. number of items)	
3-4	4
12-16	2
62-68	3
Content	
Language	
English	6
Other Language	2
Evaluative Beliefs*	
Sensory (Aesthetic)	15
Functional	11
Socio-psychological	4
Economic	5
Compositional	x
Units of Attitudes*	
Overall Attributes	15
Individual Attributes	11
Levels of Attitude Measures*	
Kinds	11
Strength	9
Types of Attitude Measures*	
Open-ended	11
Yes/No	6
Multiple Choice	8

*More than one option of this category was mentioned in individual studies.

"x" denotes this category was NOT mentioned in the studies.

Note: Categories in bold-faced print were selected for methodology being developed to measure the consumer acceptance of crops in this study.

APPENDIX 9: Classification of Data Collection Forms Used in 17 International Studies (continued)

Types of Attitude Scales*	
Ranking	4
Paired Comparison	1
Rating	
Hedonic	7
Action	1
Other (eg. **semantic differentials**)	x
Behavior Type*	
Crop Usage	9
Crop Variety Usage	3
Process Used	10
Ingredients Used	4
Products Used	11
Units of Behavior*	
Crop Category	10
Crop Variety	4
Levels of Behavior Measured*	
Kinds	11
Action Frequencies	3
Amounts Used	9
Behavior Measurement Techniques	
Recall	11
Other (eg. diary, weighed)	1
Other Consumer Attributes*	
Socio-economic	5
Demographic	8
Pretesting*	
Respondents Attributes	6
Interviewers Attributes	1
Methods	2

*More than one option of this category was mentioned in individual studies.

"x" denotes categories NOT mentioned in the studies.

Note: Categories in bold-faced print were selected for methodology being developed to measure the consumer acceptance of crops in this study.

APPENDIX 10: Classification of Methods for Collecting Data in 17 International Studies

Categories of Methods for Collecting Data	Number of Studies Classified in This Category
Time	6
Duration	3
Location	
Home	5
Laboratory	4
Market	2
Situation	
Personal	4
Group	1
Interviewer's Attributes	7
Other Researcher's Attributes	3

Note: Categories in bold-faced print were selected for methodology being developed to measure the consumer acceptance of crops in this study.

APPENDIX 11: Classifications of Methods of Analysis of Data in 17 International Studies

Categories of Methods for Analysis of Data	Number of Studies Classified in This Category
Groups of Consumers	8
Frequency	11
Central Tendency	8
Reliability	4
Validity	5
Statistical Tests	
Cross-Tabular Comparisons	8
Regression	1
Chi-square	2
Correlations	x
Errors	2
Other (**Image Profiles**)	x
RESOURCE CONSTRAINTS CATEGORY*	
Materials	2
Human	2

*More than one option of this category was mentioned in individual studies.

"x" denotes category was NOT mentioned in the studies.

Note: Categories in bold-faced print were selected for methodology being developed to measure the consumer acceptance of crops in this study.

APPENDIX 12: List of Background Studies Designed to Collect Information About Four Topics (An "x" indicates information about that topic was collected in the corresponding study. An x in bold-faced print indicates information needed to develop the questionnaire-based survey.)

Background Studies (listed in the order in which they will be conducted)	Four Topics of Information to be Collected: Cultivars Available	Consumer Groups	Conditions for Using Cultivars	Evaluative Beliefs
1 Literature Review	**x**	x	x	x
2 Informal Interviews with Public Officials	**x**	x	x	x
3 Informal Interviews and Observations in Markets	**x**	x	x	x
4 Interviews of Frequent Users	**x**	x	x	**x**
5 Cookbook Review	x		**x**	x
6 Informal Interviews and Observations in Restaurants	x		**x**	
7 Interviews with Consumers	**x**	x	**x**	**x**

APPENDIX 13: Detailed Information to be Collected about Four Topics in Background Studies

TOPIC	INFORMATION	
Cultivars	1.1-	Name and appearance of the selected crop and cultivars of that crop (eg. local name, English name, botanical name and visual characteristics of the crop)
	1.2-	General category to which the crop belongs
	1.3-	Name and appearance of other crops which are members of the same category of crops
	1.4-	Relative amounts, of the selected crop and crops in the selected category of crops, which are produced in the selected country and relative frequency of use
	1.5-	Agroclimatic zones where the crop and crops in the selected category of crops are grown in the country
Consumers	2.1-	Languages spoken in the different regions of the selected country
	2.2-	Languages and ethnic groups in the selected community
	2.3-	Geographic areas of the country where a specific language or crop which is a member of the selected category of crops is used
	2.4-	Types of formal and informal associations in the selected country and community having members who normally prepare most of the food eaten in households, having members who are from specific regions of the country, who speak languages used in the various regions of the country.
	2.5-	Miscellaneous attributes of members of the selected association in the selected community (eg. age, gender, languages spoken, place of birth, age when member moved to present community).

APPENDIX 13: Detailed Information to be Collected about Four Topics in Background Studies (continued)

TOPIC		INFORMATION
Condition	3.1-	Names and characteristics of products and ingredients made from crops in the selected category of crops (both specific and general categories of products and ingredients)
	3.2-	Relative importance of different ways of processing crops in the selected category of crops (eg. amounts processed in specific ways, frequency of consuming specific products or ingredients)
	3.3-	Description of the preparation and consumption of crops in the selected category of crops (how, where, when, with whom, by whom, how often crops in the selected category of crops are prepared and eaten)
Evaluative Beliefs	4.1-	Advantages and disadvantages of preparing and eating crops in the selected category of crops (eg. sensory or aesthetic, functional, compositional, socio-psychological, and economic criteria that consumers used to evaluate their beliefs about the use of crops)

APPENDIX 14: Questions for Interviews with Public Officials (Study 2)*

Questions for Officials in Agriculture Extension Agencies Who Are Responsible for Breeding Improved Varieties of the (Selected) Crop

(The respondents will be instructed to focus on cultivars which are grown and marketed in the country where the crop acceptance research is being conducted.)

1. What are the English names, botanical names and characteristics of cultivars, in the selected category of crops, which are grown and marketed in the selected country?

2. What are the names and characteristics of new varieties of the selected crop which are being currently tested in field trials on experimental stations in the selected country?

3. What are the different agroclimatic zones of the country?

4. Which of the crops, mentioned in response to questions 1 and 2, are grown in each of the zones mentioned in response to question 3?

Questions for Officials in Agriculture Extension Agencies Who Are Responsible For Marketing the (Selected) Crop

1. What are the local names for the (selected) crop among members of the (selected) community in the different agroclimatic zones of the country?

2. What are the ways in which the (selected) crop is processed?

3. What are the characteristics or criteria consumers use to evaluate the (selected) crop?

4. Where can the (selected) crop be purchased?

5. Who prepares the (selected) crop when it is eaten in the home?

6. How often is the (selected) crop eaten?

7. What food products are made with the (selected) crop?

8. About how often are each of the products in response to question 7 eaten?

9. Where in the country is the (selected) crop eaten by many people?

APPENDIX 14: Questions for Interviews with Public Officials (Study 2)* (continued)

10. Who mainly eats the (selected) crop?

11. When is the (selected) crop eaten? (At what times of the day and on what occasions?)

12. What, if any, relationships are there between religious factors and consumption of the (selected) crop?

13. What, if any, relationships are there between demographic factors and consumption of the (selected) crop? (Demographic factors include age, gender, education, region of residence or birth, language e.g. see characteristics mentioned in question 2 of interview questions for officials of associations.)

Questions for Officials in Informal and Formal Associations

1. What formal or informal associations are there in the (selected) community?

2. What are the demographic characteristics of the population in the different agro-climatic zones of the (selected) country and of members in the associations mentioned in response to question 1. (Characteristics is defined as including the gender of the persons who prepare most of the food in the household, the ages of the people who normally cook in the home, the languages spoken in the different parts of the (selected) country, and in the homes of members of the association, the number of years members of the association have lived in the (selected) community, regional origin or birthplace of members of the association, presence of committees for women, youth, seniors or other groups of the association).

3. What is the relative distribution of members in the groups (age, language, etc.) of the association membership which were mentioned the official in response to question 2?

4. When and where does the membership of the association meet?

*The questions are designed to be structural and attribute questions appropriate for qualitative research according to definitions and recommendations of Spradley and McCurdy (1972).

APPENDIX 15: Procedures and Questions for Interviews with Retailers (Study 3)*

Procedures

To begin the interview the interviewer approaches the retailer to ask for assistance in learning more about several items which are for sale in the store. The interviewer points to crops in the (selected) category and asks the retailer the following questions:

1. What are these called?

2. Which of these are the most popular (eg. Which are usually sold in the greatest volumes/month)?

3. What do you believe are the ways your customers usually prepare (the popular crops). (Insert the names of the crops mentioned by the retailer in response to question 1 or again point to the crops the retailer mentioned to answer question 2.)

5. What types of customers buy crops (in the selected category) and (what types of customers buy the popular crops)? (Insert the names of crops mentioned in response to question 1 and point to the crops that were identified in response to question 2.)

6. During the interview, the interviewer will observe the gender, approximate age and other attributes of the retailer which the retailer may voluntarily mention (e.g. region of birth, first language, etc.).

*The questions are designed to be structural and attribute questions appropriate for qualitative research according to the definitions and recommendations of Spradley and McCurdy (1972).

APPENDIX 16: Procedures and Questions for Interviews with Frequent Users (Study 4)*

After exchanging introductory comments at the "Frequent Users" house, the interviewer explains the purpose of the study. The interviewer begins by asking the respondent to open the notebook of samples, examine the samples and place an adhesive label on the samples of crops that the respondent has prepared or eaten. The interviewer records the numbers of samples the respondent has prepared or eaten. The interviewer proceeds to ask the following questions:

1. What name do you use to refer to this sample? (Point one by one to samples that were labeled by the respondents and record names of samples.)

2. After looking at the samples you have labeled, place a second adhesive label on the samples you use most frequently. (The interviewer records numbers of samples used most frequently.)

3. About how often do you use this? (Interviewer points one by one to each of the samples that are frequently used and records responses for each.)

4. What are the ways you have for usually preparing this? (Repeat question as often as necessary while pointing to another sample that is labeled with two adhesive labels.)

5. Are there any other ways you have for preparing these samples? (If yes, ask what are the other ways you prepare the samples and point to each sample that was frequently used.)

6. What are the conditions for serving the samples that you frequently prepare and eat? (Repeat question and each time insert one of the following conditions: Who usually prepares? To whom do you usually serve? Where do you usually eat? When do you usually serve? Are there any special seasons or occasions when you serve?).

7. What are the advantages of preparing and eating this sample? (Point to each crop one by one marked with two adhesive labels and repeat this question each time.)

8. Where do you usually purchase this? (Repeat question and point each time to another of the crops that are frequently used by the respondent.)

9. Where do you go to buy ready-to-eat foods prepared from these crops? (Point to crops in the selected category. Probe to obtain names of restaurants and other places that sell ready-to-eat foods.)

APPENDIX 16: Procedures and Questions for Interviews with Frequent Users (Study 4)* (continued)

10. Approximately how many years have you lived in (the selected community)? (Insert name of community.)

11. What langauges are usually spoken in your household?

12. In what region of the country were you born? (Show map if necessary.)

13. Interviewer records gender, estimated age and other attributes which the respondent may have voluntarily mentioned during the course of the interview.

14. Interviewer records association to which the respondent belongs and how the respondent was identified and contacted (e.g. through whom).

* Questions are designed to be structural and attribute questions as per the definitions given by Spradley and McCurdy (1972).

APPENDIX 17: Procedures for Repertory Grid Technique in Interviews with Consumers (Study 7)

(Derived from McFayden, 1972 and Frost and Braine, 1967)

Coded bags of samples of the selected crops will be drawn at random from a container and placed in rows in front of the respondent. The respondent will be instructed to remove any samples that she (he) has never prepared or eaten. These samples will be set aside and not used for the remainder of the interview. The codes for these samples will be deleted from a survey grid, which will serve as a record of the response. The respondent will be asked to name each of the remaining samples. These samples will be returned to the container and the respondent will then be instructed to:

a) draw three samples from the container,

b) examine the samples, think about preparing and eating the samples (in the selected place, with the selected people, within the selected time) and to think of a way in which two of the samples are similar and different from the third sample.

Having differentiated between the three samples, the respondent will be asked to categorize the samples remaining in the container on the same basis. The interviewer will record the results on a survey grid. Plus and minus signs will be used to distinguish the categories used to divide the samples. The three samples drawn from the container in the development of a construct will be identified with circles around the plus and minus signs of the corresponding cells (see Page 173).

APPENDIX 17: Procedures for Repertory Grid Technique in Interviews with Consumers (Study 7) (continued)

The samples will be returned to the container and mixed with the others. The selection of new sets of samples will be repeated until the respondent can not think of any new evaluative beliefs. The respondent will then be instructed to draw another three samples from the container. If the respondent supplies a new evaluative belief the procedure will be continued. If the respondent does not identify another new belief the interviewer will proceed to the second part of the interview. For the Repertory Grid portion of the interview, respondents will be instructed to mention a different evaluative belief each time they draw three samples. The same samples may be used if they are drawn at random from the container.

APPENDIX 17: Procedures for Repertory Grid Technique in Interviews with Consumers (Study 7) (continued)

Example of evaluative belief development from 3 bags which contain different crop samples

A. If the 3 bags of samples drawn at random by the respondent are:

Sample 4	Sample 2	Sample 8

B. The interviewer asks: "How are two of these samples different from the other sample and similar to one another?"

C. A sample response is: "Sample 8 and Sample 2 differ from Sample 4 in that the latter is not something we eat'."

D. This evaluative belief is recorded by the interviewer as follows:

EVALUATIVE BELIEF NUMBER	+	-
1	we would eat	we would not eat
2		

APPENDIX 17:. Procedures for Repertory Grid Technique in Interviews with Consumers (Study 7) (continued)

E. The respondent would then categorize the remaining samples in the container on this basis and the results would be recorded by the interviewer as follows: (x = a sample not used by the respondent).

CROP / SAMPLE / EVALUATIVE BELIEF	1	2	3	4	5	6	7	8	.....
1	+	⊕	-	⊖	-	+	X	⊕	
2									

APPENDIX 18: Form Used for and Results from Observations in 6 Markets (Study 3)

Note: Numbers indicate the number of markets selling items listed.

Store Name _____ Date _____

Address _____ Time ____ to ____

Source of Products _____

Pulse Name (English and other)	Form Whole	Canned	Split w. Hull	Split wo. Hull	Flour	Other
Adzuki	4					
Broadbean	1					
Canadian Pea						
green	4	1		3		2
yellow	3	1		4	2	
Chickpea						
red-brown	6					
wh.-yellow	6	5		4	3	3
Cowpea						
Black-eyed	6	1	4			1
Fababean						
large	4					1
small	2					
Haricot	2	1				
Hyacinth	4	1		4		
Beans						
black	3					
pink	1					
pinto	2					
navy (sm. wh.)	1					
grt.northern(lg.)	3					
lgt. red	5					
dk. red (kidney)	5	1				
yellow(golden)eye	1					
dark red sm.	2	2				
romano	2					

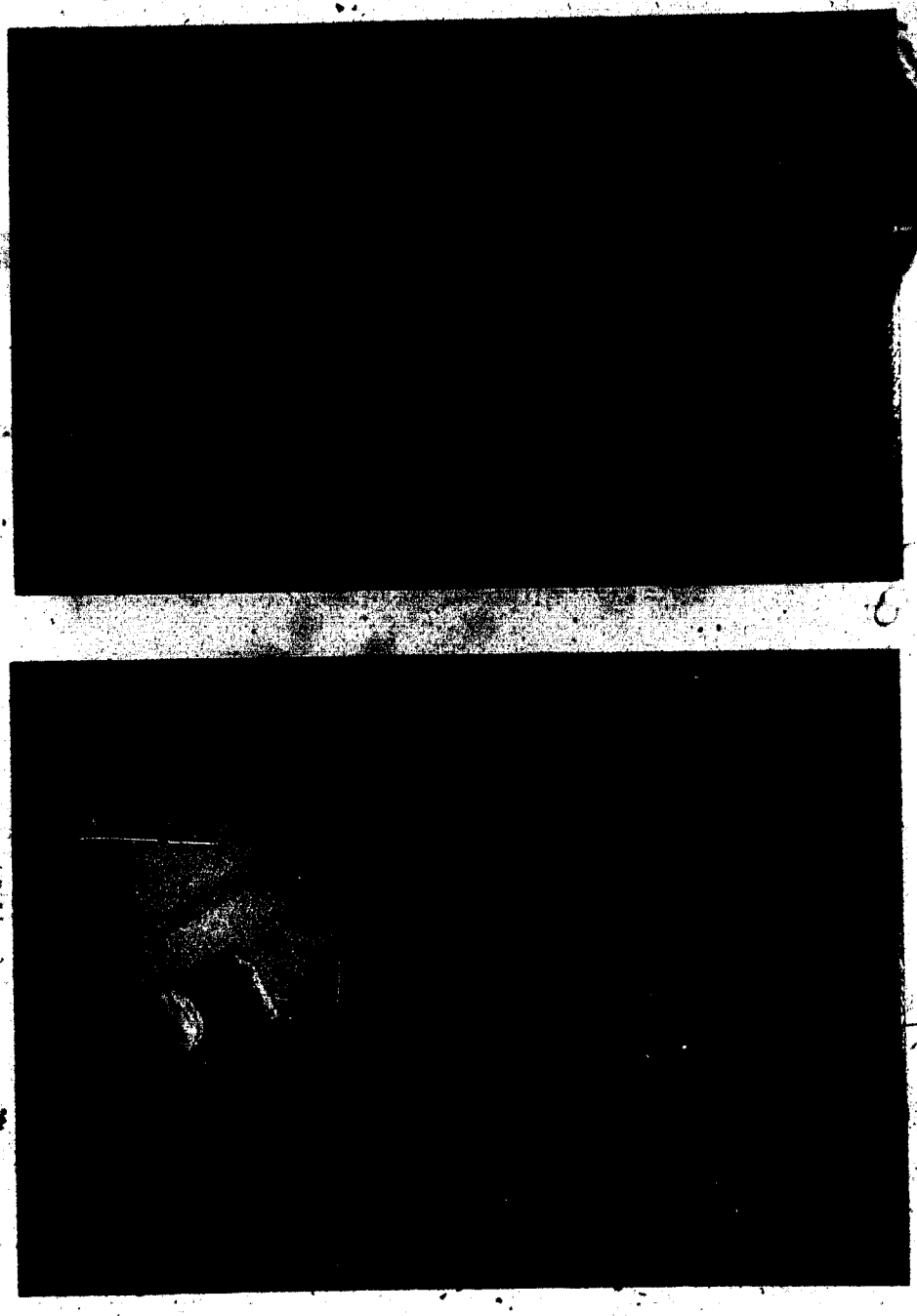
APPENDIX 18: Form Used for and Results from Observations in 6 Markets (Study 3) (continued)

	Form Whole	Canned	Split w. Hull	Split wo. Hull	Flour	Other
Lima						
large	1					
small	2	2				
Lentil						
Turkish	5		5	5		
Laird	5	1				1
Eston						
Lupin		1				
Mung						
green	6	5	4	3		
black	5	5	4	3		
Pigeon Pea	5	3	3			1
Soybean	4					
Other						
Chori	4					
Sutari(rice bean)						
Moth	4					
Total Numbers of Beans Available in Different Forms	31	15	5	7	2	6

Key to Abbreviations

sm = small
wh = white
lg = large
lgt = light
dk = dark
w = with
wo = without

APPENDIX 19: Large Notebook Used for Interviews with Frequent Users and Other Notebooks and Materials Used for Interviews with Consumers in Studies 7 and 8



APPENDIX 19: Large Notebook Used for Interviews with Frequent Users and Other Notebooks and Materials Used for Interviews with Consumers in Studies 7 and 8 (continued)

Pulse Samples Shown to Frequent Users

(Listed in the order in which they were displayed on pages in a large notebook.)

Page 1 Samples

Small Navy Beans
Small Black Beans
Small Pink Beans
Small Red Mexican Beans
Large Great Northern Beans

Page 2 Samples

Pinto Beans
Romano Beans
Yellow-eye Beans
Large Red Kidney Beans
Large Dark Red Kidney Beans
Mottled Romano Beans

Page 3 Samples

Yellow Peas
Green Peas
Soyabeans
Pink Pigeon Peas
Grey Red Pigeon Peas

Page 4 Samples

Lupins
Small Faba Beans
Large Faba Beans
Broad Beans
Small Lima Beans
Large Lima Beans

Page 5 Samples

Motth
Black Mung Beans
Green Mung Beans
Red Adzuki Beans
Brown Adzuki Beans
Black-eyed Cowpeas

Page 6 Samples

Hyacinth Beans
Brown Chickpeas
Yellow Chickpeas
Egyptian Lentils
Eston Lentils
Laird Lentils

Page 7 Samples

Split Hyacinth Beans
Split Black Mung Beans (with hull)
Split Washed Black Mung Beans (without hull)
Split Green Mung Beans (with hull)
Split Washed Green Mung Beans (without hull)
Split Egyptian Lentils

Page 8 Samples

Split Yellow Chickpeas
Split Green Peas
Split Yellow Peas
Split Washed Pigeon Peas (without hull)
Split Washed and Oiled Pigeon Peas (without hull)

APPENDIX 19: Large Notebook Used for Interviews with Frequent Users and Other Notebooks and Materials Used for Interviews with Consumers in Studies 7 and 8 (continued)

Pulse Samples Shown to Frequent Users

(Listed in the order in which they were displayed on pages in a large notebook.)

Page 9 Samples

Eston Lentils
Discolored Eston Lentils
Egyptian Lentils
Commercial Laird Lentils
Discolored Laird Lentils
Laird Lentils

Page 10 Samples

French Lentils
Medium Chilean Lentils
Large Chilean Lentils (with red cotyledon)
Large Chilean Lentils

Page 11 Samples

Split Small Egyptian Lentils (without hull)
Split Small Egyptian Lentils (with oil and without hull)
Split Large Egyptian Lentils
Split Eston Lentils (without hull)
Split Laird Lentils (without hull)

APPENDIX 20: Procedures Used for Informal Interviews in Restaurants (Study 6)

1. I am interested in learning how to prepare dal and I wonder if you could tell me the names of all the dishes, that are prepared and served here, which contain dal?

2. What are the different ways for preparing the most popular dishes which you serve that contain dal?

3. Observe attributes of respondent (e.g. age, gender).

4. Ask to purchase a serving of each dish and record names and prices.

5. Other observations: language of words on menus and regional focus of the restaurant, cooperativeness of respondent.

APPENDIX 21: Procedures for Telephone Conversation in Study 7

Hello, Mrs. _____. My name is Sally Vogel. I am a graduate student in the Home Economics Faculty at the University of Alberta. I am doing a study of consumer opinions of various types of dal. I've met with (insert name of person who gave researcher the respondents's name) to tell him/her about this study. He/she gave me the names of people who might be willing to talk to me for 45 minutes as a part of this study. Would it be possible to meet in your home to show you samples of 20 different dal and ask questions related to the dal to learn more about your opinions of these dal? If there should be any question you do not wish to answer you are of course free to tell me to proceed to the next question. There is no right or wrong answer to any of the questions.

APPENDIX 22: Final Version of Questionnaire for Interviews with Consumers (Study 7)

Hello! I'm Sally Vogel and I'm doing a consumer opinion survey for the university. I would like to ask a few questions of the person who usually prepares the meals that are eaten in the household.

PART I. IDENTIFY NAMES AND EVALUATIVE BELIEFS

1. Do you prepare and eat dal in your household?

2. These packages contain samples of different kinds of dals. Please look through the samples and discard any you have not prepared or eaten.

INTERVIEWER should:

a) list the code numbers of samples used (cross out numbers on response form of samples not used)

b) ask respondent to indicate the name the respondent usually uses to refer to each of the remaining samples (write name on response form)

3. To discover your ideas about these samples, I'd like you to examine the samples and tell me one advantage and/or disadvantage of preparing and eating any of the samples. (Interviewer records evaluative belief mentioned on response form).

4. When you have decided an advantage or disadvantage of preparing and eating any of the samples, I would like you to separate the samples remaining into those which are like the first samples and those which are not like the first samples. Tell me the numbers which are on the packages of samples in each group. (If the respondent has classified the samples, the interviewer should record both dimensions of the evaluative belief recorded for question 3, by recording the positive first and the negative second. Record + and - respectively for the samples evaluated in question 4. Repeat the classification according to each evaluative belief that is mentioned until the respondent cannot think of any more evaluative beliefs). If the respondent proceeds to talk about all of the samples, rather than three selected samples, ask the respondent to place all of the samples into groups according to any advantages and disadvantages for preparing and eating the samples that the respondent may recall.

PART II. RANKING

5. Take all of the samples that the respondent uses and place them in a row. Then ask the respondent to "Push forward the samples

APPENDIX 22: Final Version of Questionnaire for Interviews with Consumers (Study 7) (continued)

prepared and eaten most often at home with members of the household". (Record the numbers of samples pushed forward).

6. For each sample that is pushed forward, ask the respondent to indicate how frequently that sample is normally prepared and eaten in the household. (Record frequency reported).

7. Place packages of five whole pulses (small Egyptian lentils, Laird lentils, yellow chickpeas, pigeon peas, green mung beans) in front of respondent and ask the respondent to "Arrange the packages according to how much you like the sample by placing the sample(s) you like most first, the sample(s) you least last and the other sample(s) in between".

8. Place packages of four split pulses (yellow chickpeas, small Egyptian lentil, oily pigeon pea, split but not dehulled green mungbean) in front of respondent and ask the respondent to "Arrange the packages according to how much you like the sample by placing the sample(s) you like most first, the sample(s) you like least last and the other samples in between".

PART III. RATINGS

9.-17. Using the scales shown, rank each whole and split dal by pointing to the position on the card that corresponds to your opinion (the nine samples from questions 7 and 8 are shown one by one each time this question is repeated).

Taking everything into consideration. how do you find this sample?

Like Extremely — Dislike Extremely

(__) : (__) : (__) : (__) : (__) : (__) : (__) : (__) : (__)

I intend to prepare and eat this dal at home with members of the household in the next two weeks.

Likely — Not Likely

(__) : (__) : (__) : (__) : (__) : (__) : (__) : (__) : (__)

PART IV. Identification of NORMATIVE BELIEFS and PRODUCTS

18. Who would think it is a good idea to prepare and eat this (show sample of whole small Egyptian lentil)? That is, who would like it if you prepared and ate this?

APPENDIX 22: Final Version of Questionnaire for Interviews with Consumers (Study 7) (continued)

19. Who would think it is not a good idea or would not like it if you prepared and ate this (show sample of whole small Egyptian lentil)?

20. Are there any other people that you might think of when you consider preparing and eating this (show sample of whole small Egyptian lentil)?

21. What foods are you likely to prepare and eat at home with members of the household from this (show small whole Egyptian lentil)? If necessary probe to obtain description of how the product is prepared.

22. Repeat question 18 but show sample of whole Laird lentils.

23. Repeat question 19 but show sample of whole Laird lentils.

24. Repeat question 20 but show sample of whole Laird lentils.

25. Repeat question 21 but show sample of whole Laird lentils.

26. Are there any other foods you are likely to prepare and eat at home with members of the household from any of the other samples? (If yes, obtain names of food prepared from specific samples and a description of how the foods are prepared.)

PART V. PERSONAL DATA

Because food patterns change over time, and as people travel from place to place, the next questions are designed to relate to this topic.

27. Name all of the countries in which you have ever lived?

28. About how old were you when you came to Canada? (Ask only if respondent has lived in other countries than Canada.)

30. In what country were you born? (Obtain name of province or region)

31. In what country was your spouse born? (Obtain name of province or region)

32. What languages have you spoken in all of the houses in which you have every lived?

33. On your last birthday in what age category were you? (Show card with list of age categories.)

We have reached the end of the interview.
Thank you for cooperating in this study!

APPENDIX 23: Final Version of Form Used to Record Responses for Interviews with Consumers (Study 7)

Respondent's Name _____

Code Number _____

Address _____

Telephone Number _____

Association Number _____

Date _____ Time _____

Code Number _____

Q. 1. Yes No (circle one)

Q. 2. Samples Discarded and Names of Remaining Samples (circle ones discarded)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

Q. 3. + Evaluative Belief aluative Belief

Evaluative Belief

1. _____ _____
2. _____ _____
3. _____ _____
4. _____ _____
5. _____ _____
6. _____ _____
7. _____ _____
8. _____ _____
9. _____ _____
10. _____ _____
11. Like Do Not Like
12. Likely to Prepare Not Likely to Prepare

Q. 4. Pulse Sample

Evaluative Belief	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				

Code Number _____

Q. 5. Samples Prepared and Eaten Most Often

_____
_____
_____
_____
_____
_____
_____

Q. 6. Frequency Prepared and Eaten

_____
_____
_____
_____
_____
_____
_____

Q. 7. Whole Pulse Ranking
Samples NOT USED: _____

Most Liked _____

_____
_____
_____

Least Liked _____

Q. 8. Split Pulse Ranking
Samples NOT USED: _____

Most Liked _____

_____
_____

Least Liked _____

Code Number _____

Q. 9. Sample 2

Like Dislike
Extremely (__):(__):(__):(__):(__):(__):(__):(__):(__): Extremely

Likely (__):(__):(__):(__):(__):(__):(__): Not Likely

Q. 10. Sample 5

Like Dislike
Extremely (__):(__):(__):(__):(__):(__):(__):(__):(__): Extremely

Likely (__):(__):(__):(__):(__):(__):(__): Not Likely

Q. 11. Sample 6

Like Dislike
Extremely (__):(__):(__):(__):(__):(__):(__):(__):(__): Extremely

Likely (__):(__):(__):(__):(__):(__):(__): Not Likely

Q. 12. Sample 8

Like Dislike
Extremely (__):(__):(__):(__):(__):(__):(__):(__):(__): Extremely

Likely (__):(__):(__):(__):(__):(__):(__): Not Likely

Q. 13. Sample 10

Like Dislike
Extremely (__):(__):(__):(__):(__):(__):(__):(__):(__): Extremely

Likely (__):(__):(__):(__):(__):(__):(__): Not Likely

Q. 14. Sample 11

Like Dislike
Extremely (__):(__):(__):(__):(__):(__):(__):(__):(__): Extremely

Likely (__):(__):(__):(__):(__):(__):(__): Not Likely

Q. 15. Sample 12

Like Dislike
Extremely (__):(__):(__):(__):(__):(__):(__):(__):(__): Extremely

Likely (__):(__):(__):(__):(__):(__):(__): Not Likely

Q. 16. Sample 16

Like Dislike
Extremely (__):(__):(__):(__):(__):(__):(__):(__):(__): Extremely

Likely (__):(__):(__):(__):(__):(__):(__): Not Likely

Q. 17. Sample 20

Like Dislike
Extremely (__):(__):(__):(__):(__):(__):(__):(__):(__): Extremely

Likely (__):(__):(__):(__):(__):(__):(__): Not Likely

Code Number _____

Q. 18. People Who Approve of Egyptian Lentil

Q. 19. Who Disapprove

Q. 20 Others

_____ _____ _____
_____ _____ _____
_____ _____ _____

Q. 21. Foods Likely Prepared from Egyptian Lentil.

_____
_____

Q. 22. People Who Approve of Laird Lentil

Q. 23. Who Disapprove

Q. 24 Others

_____ _____ _____
_____ _____ _____
_____ _____ _____

Q. 25. Foods Likely Prepared from Laird Lentil.

_____
_____

Q. 26. Other Foods Likely to Prepare with Pulses.

No. If Yes, Specify: _____
_____
_____

Q. 27. Has lived in other countries

No. If YES specify countries:

Q. 28. Estimated age when came to Canada: _____

Q. 29. Estimated time have lived in Canada: _____

Q. 30. Birthplace (state province, region of country)

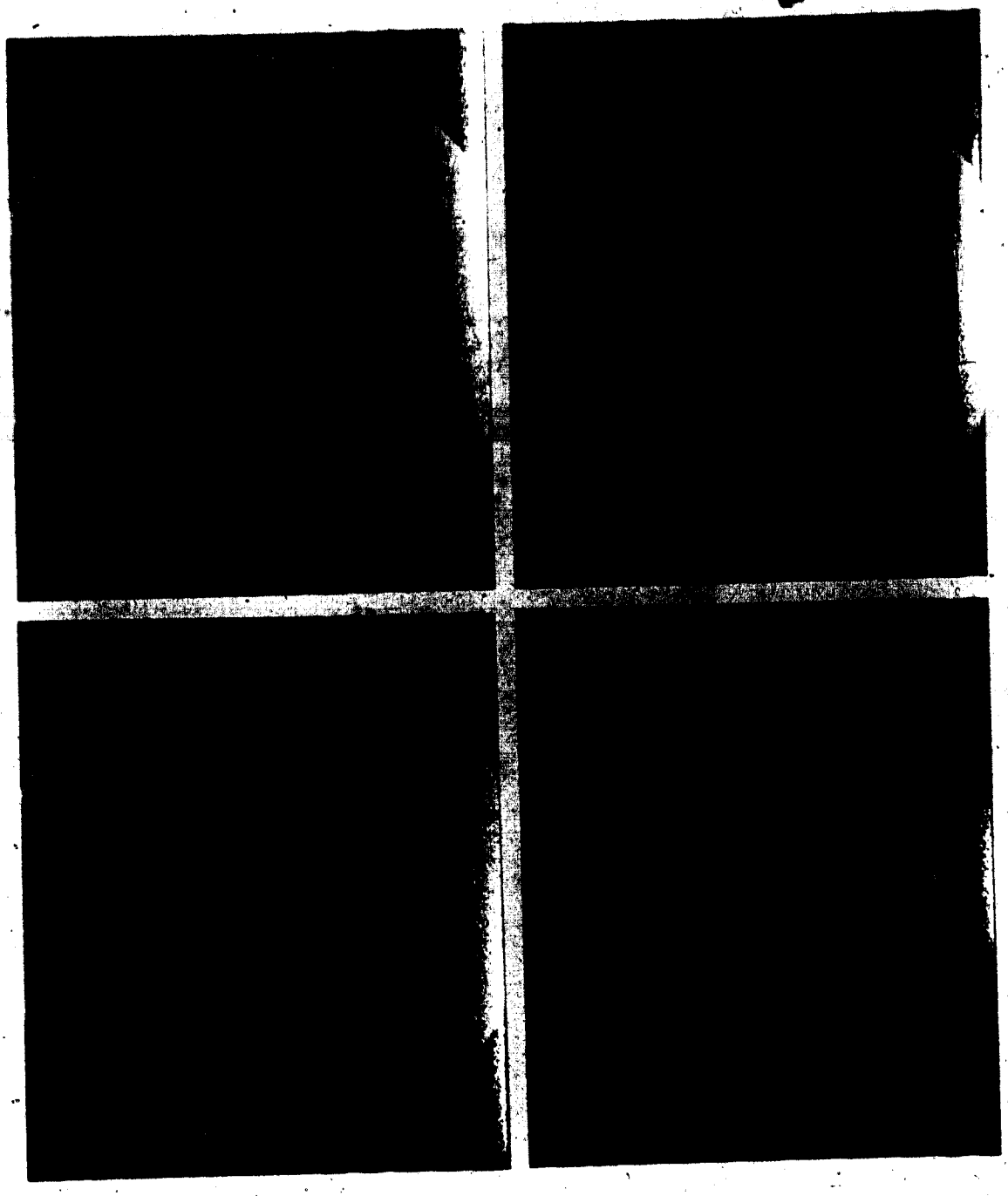
_____

Q. 31. Spouse's birthplace: _____

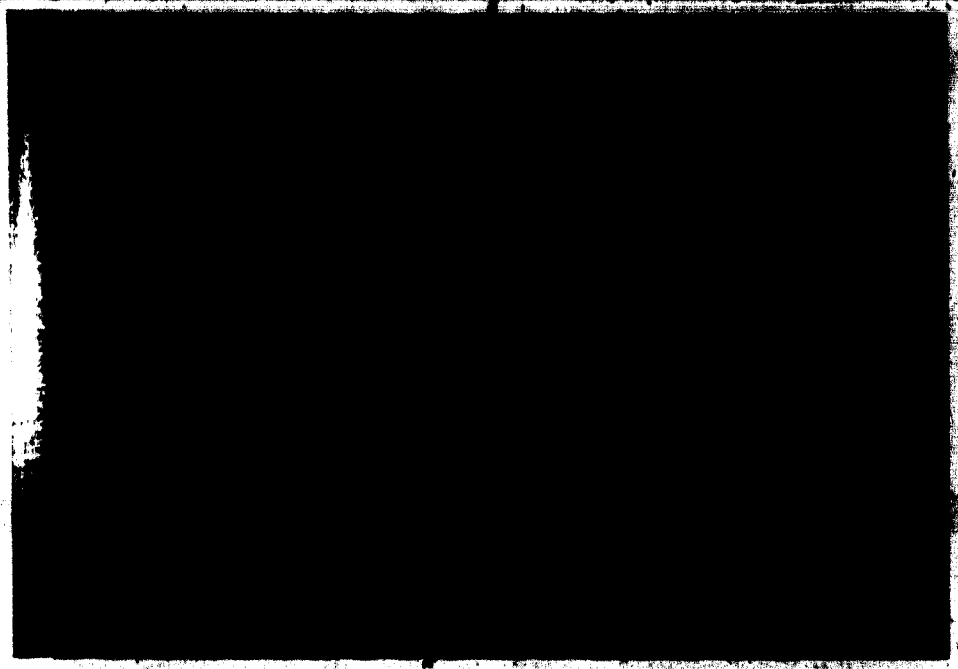
Q. 32. Languages spoken in home: _____

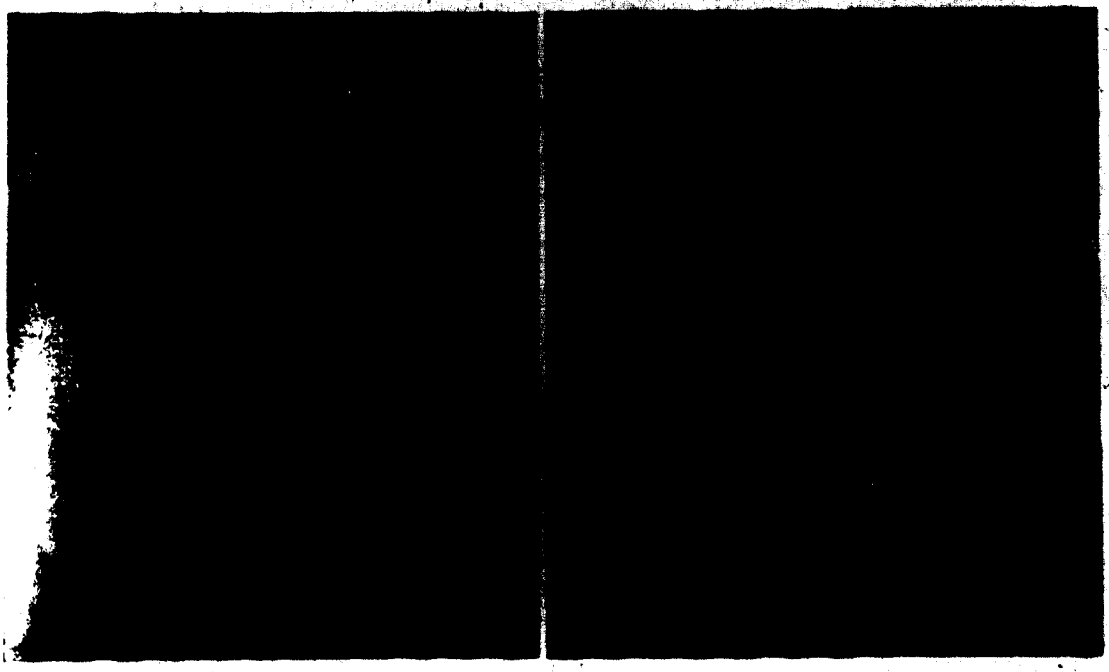
Q. 33. Age at last birthday: _____

APPENDIX 24.1: Dishes Prepared From Pulses
(7=Dal Maharani, 9=Chole, 5=Sambar, 7=Vada)

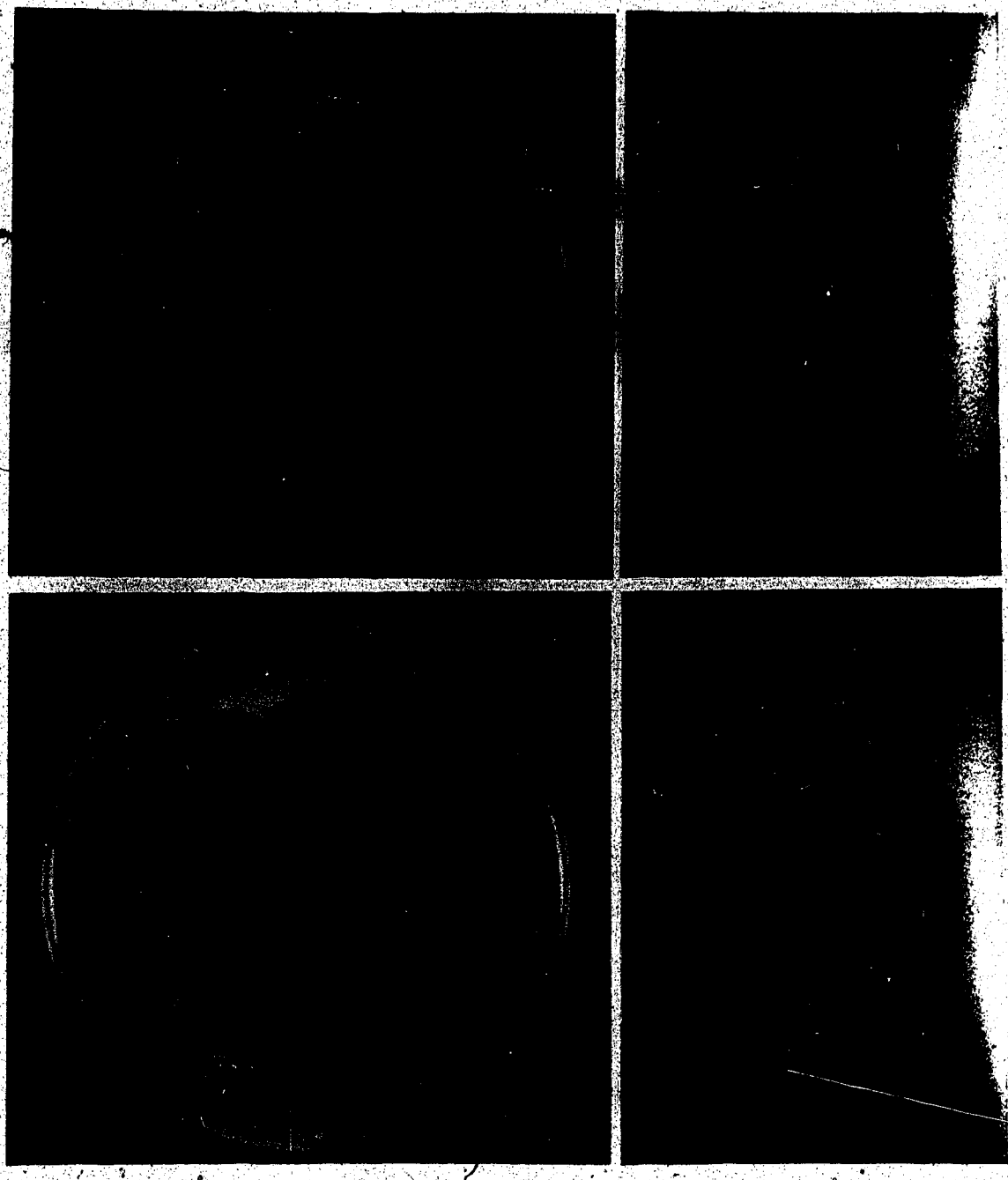


APPENDIX 24.2: Dishes Prepared From Pulses
(4=Dosai, 1=Kachori, 3=Pakora)

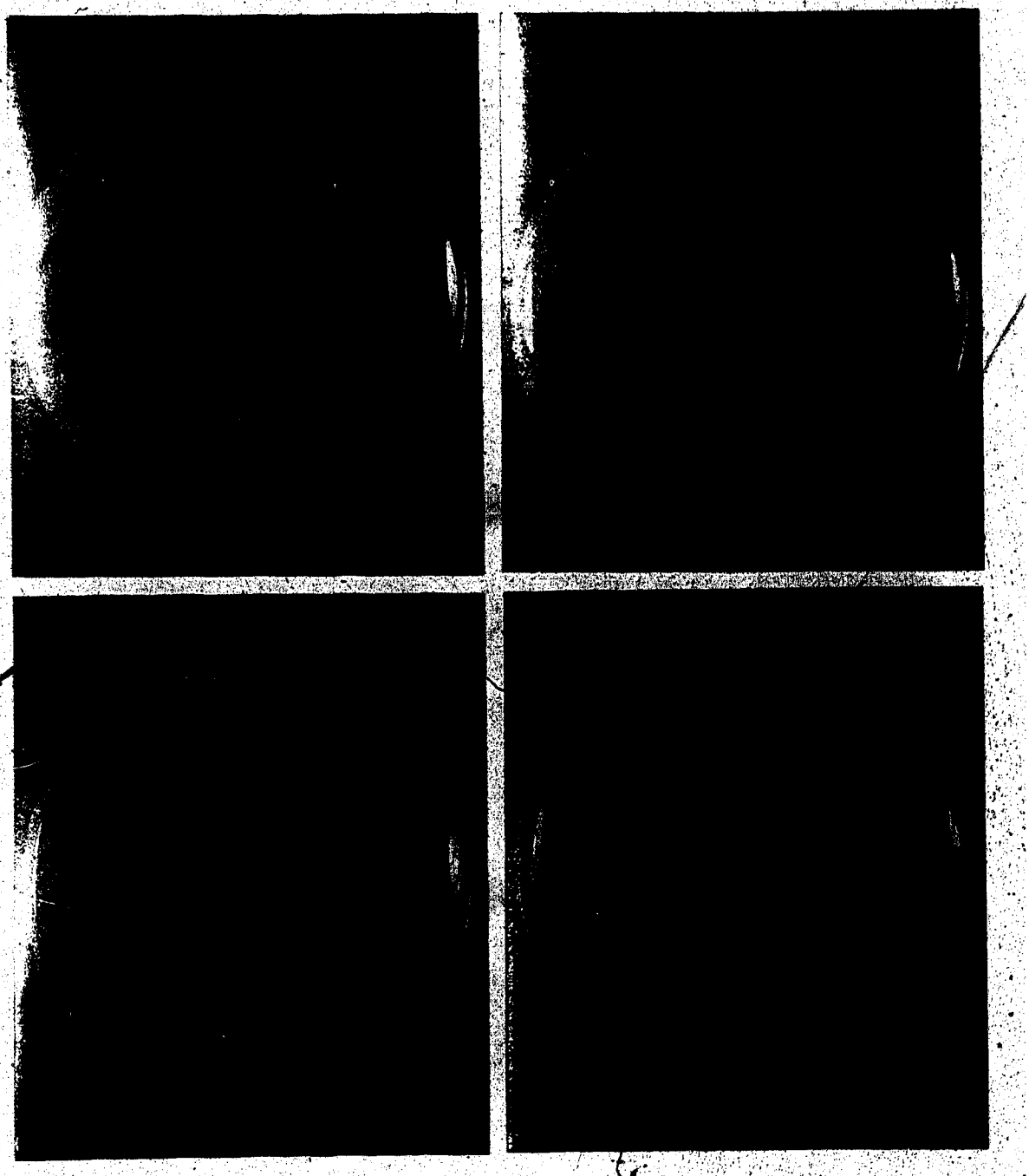




APPENDIX 24.3: Dishes Prepared From Pulses
(12=Papad, 13=Sev, 6=Ladoo)
3=Idli



APPENDIX 24.4: Dishes Prepared From Pulses
(1=Purin Puri, 2=Ahnduo, 4=Sprouted and Boiled Eston Lentils, 5=Split and Cooked Eston Dal)



Appendix 25: Procedures and Questionnaire for Study 8

Telephone Dialogue

Hello! My name is Sally Vogel. I am a graduate student in the Home Economics Faculty at the University of Alberta. I am doing a study of consumer opinions about various types of dal. I've met with _____ at the India Center to tell him about this study.

He gave me a list of the members of the Council of India and suggestions of people who might be willing to talk to me as a part of this study. Would it be possible to meet you for 45 minutes to learn your opinions about various dals? After the interview I will leave two samples of dal for you to try. Then I will call again in two weeks to see if you have had an opportunity to prepare the dal. After you have prepared the dal I will come to learn your opinions of the dal. This second interview will take up to 15 minutes.

I can drive to your house or we can arrange to meet elsewhere at a convenient time. (Record address, exchange telephone numbers, time and date of meeting. Interviewer also asks the following until 4 respondents have agreed to keep a diary.)

As a part of another study would you also be willing to keep a diary of your menus for the next two weeks?

Thank you for participating in this study.

Questionnaire for Interview 1

Interviewer wears name tag, carries logo of the Provincial Home Economics Association and displays brochure for Women's Association.

Hello Mrs. _____. I am Sally Vogel. Thank you for arranging to meet with me. As mentioned on the telephone, I would like to learn your opinions of various dal by asking a number of questions. There are no right or wrong answers to the questions because opinions can vary from person to person. To answer the questions, just think about your own opinions and the opinions of those in your household, not the opinions of other people. If you do not wish to answer any of the questions, just tell me to go on to the next question. The interview will last 45 minutes and your answers will be held in strictest confidence.

Note: Asterisk "*" denotes name of variable measured by the subsequent questions.

Screening Questions

Q1. Who prepares most of the food eaten in your household?

Q2. Do you prepare and eat dal in your household?

Q3. I understand that various types of dishes may be prepared from different dals. For example, dishes similar to those shown in these pictures may be prepared. Show pictures and ask "Does this look like any dish you prepare? What would you call the dishes that look something like this dish"? Turn to next page to repeat question while pointing at pictures for next category of dishes.

*Consumption of Prepared Dishes

Q4. Now look through the dishes again and tell me which if any of these that you frequently prepare and eat in your household? I understand that you may use different dal to prepare the dishes in these pictures so think about the dishes and not the dal which was used to prepare the dishes shown in these pictures.

(Interviewer records whether dish is eaten frequently or not frequently.)

*Reported Frequency of Consumption of Dishes

Q5. (Interviewer pages through the pictures of prepared dishes and repeats the following question each time while pointing to the dishes.)

About how often/week do you prepare this dish? (Interviewer records level of frequency reported by respondent.)

*Consumption of Crops

(Interviewer places only 14 crops, not the two Eston samples, in front of the respondent.)

Q6. These packages contain samples of different kinds of whole and split dal. Please look through the samples and remove any you have not prepared or eaten. (Interviewer removes samples not used and records sample as being used/not used.)

*Crop Acceptance (Ranking of Liking of Crops)

Q7. (Interviewer presents only the samples remaining in Q6 and asks the following question.)

Remove the three dals which you like to prepare and eat most and arrange them according to how much you like them. Put the dal you like most here, the dal you like least here, and the other dal in the space in between. (Interviewer points to a position farthest and closest to the respondent to indicate most and least.) (Interviewer records samples Liked Most, Second Most, Third Most, Not Most.)

*Consumption of Crops

Q8. (Interviewer records whether a crop Has been or Has Not been prepared and eaten most frequently.

Using only the samples which were not discarded in Q6, the interviewer asks the following question.)

Which of these samples do you prepare and eat most often as a part of the meals served in your home?

*Reported Frequency of Crop Consumption

Q9. (Interviewer mixes samples identified in Q6 and asks the following questions while holding the samples one by one.)

About how often per week do you prepare and eat this sample as a cooked dal dish?

(Interviewer records level of frequency reported by respondent.)

In the next questions I would like you to think in terms of preparing and eating different samples of dal as a cooked dal dish of this type (show picture of Dish 1) at home, with members of your household, in the next two weeks.

On the next pages of this booklet, you will find several rating scales with seven places. You are to make a check mark in the place that best describes your opinion. For example, if you are asked to rate the appearance of this dal on such a scale, the seven places should be interpreted from left to right as: like extremely, like very much, like slightly, neither like nor dislike, dislike slightly, dislike very much, and dislike extremely.

Like Extremely (___):(___):(___):(___):(___):(___):(___) Dislike Extremely

Do you understand how to use the scales?

Remember to think about preparing and eating the dal shown as a cooked dal dish of this type (show picture) at home with your household in the next two weeks.

Give respondent rating scales and ask respondents to rate the importance of each of the listed outcomes by using the following questions.

*Importance of Selected Evaluative Beliefs (for theory of Reasoned Action)

Q10. Preparing and eating a dal which makes a tasty cooked dal dish is:

Q11. Preparing and eating a dal which does not require soaking before it is cooked as a dal dish is:

Q12. Preparing and eating a dal which requires a short time to cook as a dal dish is:

Q13. Preparing and eating a dal which is easy to mash into a puree after cooking it for a dal dish is:

Q14. Preparing and eating a dal which is easy to digest when it is prepared as a cooked dal dish is:

Q15. Preparing and eating a dal to which my household is accustomed to eating as a cooked dal dish is:

Q16. Preparing and eating a dal which is nutritious when cooked as a dal dish is:

Give respondent a notebook of samples and response booklet and say "The next questions refer to the dal samples in this notebook. The numbers in the booklet correspond to the numbers on samples in this notebook. Each time you see a new number in the booklet, turn to a new sample and answer the questions for that sample."

(Note: For questions 17-38, if respondent says I don't know or this question is not applicable to this dal, the interviewer tells the respondent to write a DK or NA in the margin next to the question and to then proceed to the next question.

*Behavioral Intention (for theory of Reasoned Action)

Q17. I intend to prepare and eat this dal as a cooked dal dish of the type shown in this picture, at home with my household in the next two weeks.

*Attitude (for theory of Reasoned Action)

Q18. My preparing and eating this dal as a cooked dal dish of the type shown in this picture, at home with my household in the next two weeks would have:

*Subjective Norm (for theory of Reasoned Action)

Q19. Most people for whom I prepare a cooked dal dish of the type shown in this picture, and with whom I eat this dish think:

(Remember to think in terms of the cooked dal you will prepare and eat at home with your household in the next two weeks.)

*Crop Acceptance (Hedonic Rating of Crop)

Q20. Taking everything into consideration, how do you feel about this dal?

Repeat questions 17-20 while looking at the next sample in the notebook.

*Evaluative Beliefs
Questions 21-38 are used to develop a Profile of Crop Acceptance. Questions 21-27 are used to develop a Predictive measure of Crop Acceptance (e.g. an alternative measure of Attitude for theory of Reasoned Action.)

In the remaining questions (Q21-38) rate the dal that is listed at the top of each page on the scales given on that page.

Remember to think in terms of preparing and eating the dal as a cooked dal dish at home with your household in the next two weeks.

For example:Preparing and eating this dal as a cooked dal dish means that I will be making a dish which:
Q21. is tasty
Q21. usually requires soaking before it is cooked
Q23. requires a short time to cook
Q24. is easy to mash into a puree after it is cooked
Q25. is easy to digest
Q26. my household is accustomed to eating as a cooked dal dish
Q27. is nutritious
Q28. retains its shape after cooking
Q29. is usually served for a meal
Q30. is easy to sprout
Q31. is often cooked or mixed together with other dals
Q32. does not cause gas
Q33. is easy to clean and wash prior to cooking
Q34. is expensive
Q33. is good for sick people
Q36. is for guests
Q37. is filling
Q38. gives physical strength

Repeat questions 21-38 for remaining 12 samples in notebook

*Demographic Attributes of Consumers

Q39. Food patterns change over the life span as time passes and people move from place to place. The next questions relate to this topic. Would you name all of the countries in which you have ever lived? (If R has only lived in Canada, ask R to name all countries in

which the parent of R, who cooked most of the meals in R's household, has lived.)

*Age When R Arrived

Q40. About how old were you when you came to Canada? (If R has always lived in Canada determine age of parent in Q39 when that parent came to Canada.)

*Place of Birth

Q42. In what province were you born? (If R born in Canada determine birthplace of parent in Q42 and show map if necessary.)

*Spouse's Place of Birth

Q43. In what province was your spouse born? (If Canada, determine birthplace of parent in spouse's household who did most of the cooking. Show map if necessary.)

*Language Spoken in Homes

Q44. In all of the homes in which you have lived, what languages have been spoken?

*Current Age Category

Q45. In which age category are you as of your last birthday?

1)	20-25	6)	46-50
2)	26-30	7)	51-55
3)	31-35	8)	56-60
4)	36-40	9)	over 60
5)	41-45		

Q46. Here are the two dal samples I mentioned when I called. Will you prepare these in the way you normally prepare such ingredients. Then I will call again in two weeks to learn your opinions of the samples.

Thank you for sharing your opinions!

Follow-up Interview

*Crop Consumption (Dishes Prepared from Samples)

Q51. Did you have an opportunity to prepare the samples of dal you received last time we met?

Q52. What did you prepare with this sample? (Use same sample notebook presented in interview 1. Probe to learn how sample was prepared.)

Q53. What did you prepare with the other sample? (Turn page in notebook to show the other sample. Probe to learn how sample was prepared.)

"Assume both of these dal samples are available in the stores where you normally shop and that they sell for the same price as these dals (show whole and split masoor)."

Give R rating form which has scales in Q17-38 and return notebook to sample presented in Q52. Then say:

"Using these scales, indicate your opinions about this sample. When you have finished, proceed to the next dal sample and use the next scales to rate that sample. Would you like to review the use of the scales before you begin?" (If yes, repeat questions 10-13.)

Q54. Are there any other comments you would like to make about either of the two dals or the dishes you prepared from each?

THANK YOU FOR PARTICIPATING IN THIS STUDY!

Appendix 26: Response Forms for Questionnaire-based Survey (Study 8)

R's Name _____ Form 1 = R 2 = B _____
Association _____ Interview# _____
Address _____ Telephone _____
Date _____ Time _____ to _____
Km _____ _____

(Ask Q 1-49 during the first interviews and Q 51-54 during the second interview. In this Response Form, the following abbreviations are used: R = Respondent, P = Parents of Respondent, S = Spouse of Respondent, and SP = Parents of Respondent's spouse.)

Association	Code R Chosen By Leader	At Random
Andhra	11	21
Bengali	12	22
Gujarati	13	23
Hindu	14	24
Kannada	15	25
Kerala	16	26
Mahrastrian	17	27
Punjabi	18	28
Tamil	19	29

Int#_____

Q1. (Interviewer circles person who prepares most of the food eaten in the household). 1_____

1) you 2) someone else (specify whom:_____)
8) don't know 9) no answer

Q2. (Interviewer circles answer given to if dal is used). 2_____

1) yes 2) no 8) don't know
9) no answer

Q3. (Interviewer writes name of dishes prepared and eaten in household).

Type of Dishes	Name of Dishes	R's Names
1	dal, chole, raj maha, maharani dal,	_____
2	curries, sambar (w. vegetables)	_____
3	fermented dumplings (vadas, dahia, dosai)	_____
4	deep fried snacks (kachori, pakora)	_____
5	roasted salty snack (sev, channa, etc.)	_____
6	sweet snacks (ladoo)	_____

3.1_____
3.2_____
3.3_____
3.4_____
3.5_____
3.6_____

Code
1= same as listed
2=different
8=don't know
9= no answer

Q4. (Interviewer places checkmark by dishes used frequently).

Type of Dishes
1_____ 4_____
2_____ 5_____
3_____ 6_____

4.1_____
4.2_____
4.3_____
4.4_____
4.5_____
4.6_____

Code
1=use freq.
2=not freq. use
8=don't know
9=no answer

Q5. (Interviewer writes in frequency eaten/week).

Type of Dish	Frequency Eaten/Week
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____

5.1_____
5.2_____
5.3_____
5.4_____
5.5_____
5.6_____

Code
1=1 or less x/wk
2=2-3x/wk
4=4-5x/wk
6=6 or more x/wk
7=NOT USED
8=don't know
9=no answer

Q6. (Interviewer places check mark by samples not prepared and eaten).

Sample No.

11_____	22_____
12_____	25_____
13_____	27_____
14_____	28_____
15_____	29_____
17_____	31_____

6.11_____
6.12_____
6.13_____
6.14_____
6.15_____
6.17_____
6.18_____
6.22_____
6.25_____
6.27_____
6.28_____
6.29_____
6.30_____
6.31_____

Code
1=have eaten
2=not eaten/prd
8=don't know
9=no answer

Q7. (Interviewer writes number of first three samples ranked by the respondent).

Number of
Sample Liked MOST____
next most ____
third most ____
others mentioned ____

7.11____ .22____
7.12____ .25____
7.13____ .27____
7.14____ .28____
7.15____ .29____
7.17____ .30____
7.18____ .31____

Code
1=most
2=next most
3=third most
4=others mentioned
7=NOT mentioned

Q8. (Interviewer places check mark by samples prepared and eaten most often).

Number of Sample

11____	22____	8.11____	.22____
12____	25____	8.12____	.25____
13____	27____	8.13____	.27____
14____	28____	8.14____	.28____
15____	29____	8.15____	.29____
17____	30____	8.17____	.30____
18____	31____	8.18____	.31____

Code
1=use most of
2=not used of
8=don't know
9=no answer

Q9. (Interviewer writes frequency/week).

Number of Sample

11____	22____	9.11____	.22____
12____	25____	9.12____	.25____
13____	27____	9.13____	.27____
14____	28____	9.14____	.28____
15____	29____	9.15____	.29____
17____	30____	9.17____	.30____
18____	31____	9.18____	.31____

Code
1-1 or less x/wk
2=2-3x/wk
4=4-5x/wk
6=6 or more x/wk
7=NOT USED
8=don't know
9=no answer

**********Give Respondent Rating SCALES and SAMPLES**********

Q10 - 38. Circle color of sample notebook given to R.

Red Black

(Confirm color is correct by checking code on cover of Opinion Survey Part I next to "form").

Code Q1 - 38
1-7=1-7
8=don't kn.
or don't use
9=no answer

TASTY
Q10. important (_):(_):(_):(_):(_):(_):(_) not at all important

DOES NOT USUALLY REQUIRE
SOAKING BEFORE IT IS COOKED
Q11. important (_):(_):(_):(_):(_):(_):(_) not at all important

REQUIRES SHORT TIME TO COOK
Q12. important (_):(_):(_):(_):(_):(_):(_) not at all important

EASY TO MASH
Q13. important (_):(_):(_):(_):(_):(_):(_) not at all important

EASY TO DIGEST
Q14. important (_):(_):(_):(_):(_):(_):(_) not at all important

HOUSEHOLD IS ACCUSTOMED TO THIS
Q15. important (_):(_):(_):(_):(_):(_):(_) not at all important

NUTRITIOUS
Q16. important (_):(_):(_):(_):(_):(_):(_) not at all important

WILL PREPARE AND EAT THIS IN NEXT 2 WEEKS
Q17. likely (_):(_):(_):(_):(_):(_):(_) unlikely

EFFECTS OF MY PREPARING AND EATING THIS DAL
Q18. mostly good effects (consequences) (_):(_):(_):(_):(_):(_):(_) mostly bad effects (consequences)

PEOPLE FOR WHOM I PREPARE DAL
AND WITH WHOM I EAT DAL THINK:

Q19. I should use this this dal (_):(_):(_):(_):(_):(_):(_) I should not use this dal

Taking everything into consideration
how do you feel about preparing and eating this dal?

Q20. like extremely (_):(_):(_):(_):(_):(_):(_) dislike extremely

Q21. is tasty (_):(_):(_):(_):(_):(_):(_) not tasty

Q22. usually requires soaking before it is cooked (_):(_):(_):(_):(_):(_):(_) usually no soaking before it is cooked

Q23. requires a short time to cook (_):(_):(_):(_):(_):(_):(_) requires a long time to cook

Q24. is easy to mash into a puree after it is cooked (_):(_):(_):(_):(_):(_):(_) not easy to mash into a puree after it is cooked

Q25. is easy to digest (_):(_):(_):(_):(_):(_):(_) not easy to digest

Q26. my household is accustomed to eating as a cooked dal dish (_):(_):(_):(_):(_):(_):(_) my household not accustomed to eating as a cooked dal dish

Q27. is nutritious (_):(_):(_):(_):(_):(_):(_) not nutritious

Q28. retains its shape after cooking (_):(_):(_):(_):(_):(_):(_) does not retain its shape after cooking

Q29. is usually served for a meal (_):(_):(_):(_):(_):(_):(_) not usually served for a meal, served as a snack

Q30. is easy to sprout (_):(_):(_):(_):(_):(_):(_) not easy to sprout

Q31. is often cooked or mixed with other dals (_):(_):(_):(_):(_):(_):(_) not often cooked or mixed with other dals

Q32. does not cause gas (_):(_):(_):(_):(_):(_):(_) causes gas

Q33. is easy to clean and wash prior to cooking (_):(_):(_):(_):(_):(_):(_) not easy to clean and wash prior to cooking

Q34. is expensive (_):(_):(_):(_):(_):(_):(_) not expensive

Q35. is good for sick people (_):(_):(_):(_):(_):(_):(_) not good for sick people

Q36. is for guests (_):(_):(_):(_):(_):(_):(_) not for guests

Q37. is filling (_):(_):(_):(_):(_):(_):(_) not filling

Q38. gives physical strength (_):(_):(_):(_):(_):(_):(_) does not give physical strength

Q39. (Interviewer writes names of countries in which R has lived in order they are mentioned). "Did you mention the countries in the order in which you have lived in them, starting from the first to current residence?"

(Interviewer numbers countries listed with 1=country of most recent residence).
R or P's: (Circle one).

_____ _____ _____ _____

39_____

Code
1=lived in India
2=NOT in India
3=parent in India
4=parent NOT in India
8=don't know
9=no answer

Q40. (Interviewer writes age). _____R's
or_____P's

40_____
Code
1=less than 20
2=over 20
7=born in Can.
8=don't know
9=no answer

Q41. (Interviewer writes years R or P have lived in Canada).

41_____
Code
1=less than 2
2=over 2
7=born here
8=don't know
9=no answer

Q42. (Interviewer writes state or province which is R or P's birthplace).

_____R or _____P

7=Maharastra
Kanada

8=don't know
9=don't know
or other place

42_____
1=Punjabi,
Jammu,
Kashmir,
Rajasthan
2=Uttar Prad.
3=Gujarat
4=Madhya Prad.
5=Andhra Prad.
6=Bihar, Orissa

Q43. (Interviewer writes birthplace of spouse or S parent).

_____S _____SP

43_____
Code
1=same as R's
(see Q42)
2=different
than R's
8=don't know
9=no answer

Q44. (Interviewer writes languages in order they are mentioned by R).

_____(1st) _____(2nd)
_____(3rd) _____(4th)
_____(5th) _____(6th)

44.1_____
44.2_____
44.3_____
44.4_____
44.5_____
44.6_____

Code
1=Hindi
2=Punjabi
3=Marathi
4=Gujarati
5=English
6=Bengali
7=Other
9=no answer

Q45. (Interviewer places check mark in age category selected).

1) 20-25_____ 6) 46-50_____
2) 26-30_____ 7) 51-55_____
3) 31-35_____ 8) 56-60_____
4) 36-40_____ 9) over 60_____
5) 41-45_____

45_____

Code
1=same as sum
2=different than sum
8=don't know
9=no answer

Q46. (Interviewer circles if R interested in trying samples).

1) Yes 2) No 8) Don't know 9) No answer

46_____

Q47. (Circle to indicate type of opinion diary).

1) Before first interview
2) After first interview
9) Not applicable

47_____

Q48. Enter code of age category selected in Q46. 48_____

Q49. Opinion Diary

Sample Number	Times Eaten/Wk
11	____
12	____
13	____
14	____
15	____
17	____
18	____
22	____
25	____
27	____
28	____
29	____
30	____
31	____

Q50. Opinion Diary

Dishes Number	Times Eaten/Wk
1	____
2	____
3	____
4	____
5	____
6	____

49.11____
49.12____
49.13____
49.14____
49.15____
49.17____
49.18____
49.22____
49.25____
49.27____
49.28____
49.29____
49.30____
49.31____

Code as in Q5

50.1____
50.2____
50.3____
50.4____
50.5____
50.6____

Code
1=1 or less x/wk
2=2-3x/wk
4=4-5x/wk
6=6 or more x/wk
7=NOT USED
8=don't know
9=no answer

Q51. (Interviewer circles answer given to indicate if dals were tried). 51____
1) yes 2) no 8) don't know 9) no answer

**********Give R notebook of samples circled below:
Red Black

Q52. (Interviewer writes number of dal shown and names of dishes prepared in order R mentions them. Interviewer confirms dish type by showing pictures used in Q3 of first interview).

Dal #_____

Dishes Prepared	Dish Type Number (on pictures shown)
1_____	_____
2_____	_____
3_____	_____
4_____	_____

If whole dal code as 32
1=dal, samb.
2=only other dishes
8=don't know
9=no answer
If split use 33

Q53. (Interviewer writes number of dal shown and names of dishes prepared in order R mentions them. Interviewer confirms dish type by showing pictures used in Q3 of first interview).

Dal #_____

Dishes Prepared	Dish Type Number (on pictures shown)
1_____	_____
2_____	_____
3_____	_____
4_____	_____

Code as in Q52.

**********Give R SCALES**********

Q10-38
Code
1-7=1-7
8=don't know or don't use
9=no answer

Q54. (Interviewer writes answer given to indicate if R has other comments).

_____
_____

54_____
Code
1=no com
2=com
8=don't know
9=no answer

Appendix 27: Summary of Results from the Literature Review (Study 1)

NOTE: Numbers used in this appendix are cross-referenced to the topics in Appendix 13.

Information About Cultivars

1.1 Lentils are called Lens esculenta or Lens culinaris.

The seedcoat of lentils may be black, dark brown, green, light green or beige. The color of the seedcoat may be uniform or mottled. Seeds vary in size from a small and plump type to a larger and flatter type (Webb and Hawtin, 1981).

The color of lentils may change from a light green to a reddish brown color during storage. Such lentils are called aged lentils. Two licensed varieties of lentils are grown in Alberta (Alberta Pulse Growers Association, 1984; Field Crops Branch, 1983).

One licensed variety, called Eston, is a Persian type of lentil. It is small, plump and green. Laird lentils are larger, flatter and green (Slinkard and Drew, 1984).

1.2 Pulses have a low fat content and are the cultivated dried seeds of the Papilionoideae family (Aykroyd and Doughty, 1982; National Academy of Science, 1979; Kay, 1979; Siegal and Fawcett, 1976).

Gram is a word that is used in India to refer to whole pulses that have been obtained from pods. Gram has not been milled or split (Gopalan et al., 1976).

The words dal, dhal and dahl were used in similar ways by different authors. The words were used to refer to split pulses, split and dehulled pulses and boiled products which are made from split or dehulled pulses (Ahsan, 1987; Wharton et al., 1984; Desai et al., 1983; Pushpamma and Rao, 1981b; National Academy of Science, 1979; Kay, 1979).

The local, English and botanical names of twenty-seven pulses are listed by Kay (1979).

The names given to seventeen pulses which are consumed in India are listed in 11 different languages of India by Gopalan et al. (1976).

1.3 Great Northern beans, Navy beans, Small Mexican Reds, Pinks, Pinto beans, Green Laird lentils and Green peas are grown in Alberta (Alberta Agriculture, 1984).

Appendix 27: Summary of Results from the Literature Review (Study 1) (continued)

1.4 Lentils represented about 2.4% of the total world production of pulses in 1976 (Kay, 1979).

More lentils are grown in India than in any other country in South East Asia (Kay, 1979; FAO, 1977).

1.5 Most pulses grown in Alberta are produced in the Southwestern region of the Province (Alberta Agriculture, 1983).

Information About Consumers

2.1 Over 300 languages and dialects are used in India. There are fifteen official languages in India. There are 25,000 East Indian Canadians in Alberta (Odynak, 1984).

The following eight languages were used in the 1981 Canada Census to categorize Indian languages: Bengali, Cingalese, Hindi, Malayalam, Punjabi, Tamil, Teleugu, Urdu (Canada Census, 1981).

2.2 English is spoken by many East Indian Canadians. Hindi is also a common language.

2.4 There are 45 East Indian organizations in Alberta. Many of these organizations are based on the religious or regional affiliations of their members. Many members of these organizations speak an East Indian language and observe holidays as their forebears did in India (Odynak, 1984).

2.5 Some members of the East Indian community in India, Britain and Canada eat pulses daily (Wharton et al., 1984; Desai et al., 1983; Pushpamma and Rao, 1981b).

Religious groups within the East Indian community include Hindus, Jains, Muslims, Goan Christians, Syrian Christians, Parsis and Sikhs (Odynak, 1984).

Some East Indian Canadians have been in Canada for 1-10 years. Some came to Canada when they were twenty or more years old (Desai et al., 1983).

Information About Conditions for Using Crops

3.1 Pulses that are split or split and dehulled are called dhal. They are used to prepare dhal or sambar (Pushpamma and Geervani, 1981b).

3.2 Pulses are eaten as sambar or dhal, as often as once per week by many people in Andhra Pradesh India, (Pushpamma and Geervani, 1981b).

Appendix 27: Summary of Results from the Literature Review (Study 1) (continued)

East Indians in Britain, who are pregnant, may eat pulses twice a day for lunch and dinner (Wharton et al., 1984).

East Indian children (age 1-18) in British Columbia may eat pulses once a day for dinner (Desai et al., 1983).

3.3 Pulses may be cooked in many ways to prepare products such as: aundal, pakoras, idli, dhosai, kootu, and sambar (Akyroyd and Doughty, 1982).

Lentils are mainly cooked as a soup (Kay, 1979; Ahsan, 1978).

Information About Evaluative Beliefs

4.1 Cooking time is an important functional attribute of pulses (Bhatty et al., 1983, 1984).

Consumers evaluate sensory, socio-psychological and functional attributes of pulses including taste, extent to which people are accustomed to eating a pulse, extent to which a pulse is good for cooking purposes, color, size and type of pericarp (Pushpamma and Rao, 1981b).

Appendix 28: Summary of Results from Informal Interviews with Public Officials (Study 2)

NOTE: Numbers used in this appendix are cross-referenced to the topics in Appendix 13.

Information About Cultivars

1.1 Laird and Eston lentils are grown in Alberta. Eston lentils are not marketed in Alberta. Field trials are being conducted on Turkish, Nel 470 (French type), Eston (Persian type), Laird, Brewer, Red Chief and other Chilean types of lentils. A ten gram sample of six lentils which are currently being tested in field trials, was collected from one official.

Lentil cultivars that are being tested in field trials have a light green, green and pink (mottled), dark red brown or black seed coat. The cultivars are small and plump or larger and flatter.

Lentils are pulses that are called dhal by members of the East Indian community according to one Marketing Official.

Information About Consumers

2.2 Most members of the Edmonton East Indian community are Gujaratis or Ismailis. Some speak Hindi and others speak Gujarati.

2.3 Members of the East Indian community in Edmonton came to Canada from South and East Africa and Kerala. Others are Sikhs. Members of the community who came from South Africa tend to be originally from Tamil Nadu. Most people in the Ismaili Association were born in Fiji, East Africa, South Africa, India or Pakistan.

2.4 A list of 32 East Indian Associations in Alberta was obtained. The associations are classified according to the languages spoken by their members and whether or not newsletters are published and youth or history groups have been organized.

People in the Ismaili community who are Muslims may have come as refugees or entrepreneurs. There is a Seniors' and a Women's Committee. There are 100-200 women in the Seniors' group.

There is an umbrella organization which coordinates communication among individual East Indian associations. The individual associations are divided by language groups. The number of members in each association is proportional to the numbers of people from each language group that came here. Some associations have a committee for the retired and semi-retired.

Appendix 28: Summary of Results from Informal Interviews with Public Officials (Study 2) (continued)

.5 Most Ismailis came as adults 10-15 years ago. Many Sikhs are vegetarians. There are also many vegetarians among people from North India.

Older people and people who recently immigrated may eat lentils more frequently than younger people and subsequent Canadian-born generations of the family.

Information About Conditions for Using Crops

3.1 Lentils are prepared into flour, salads and main dishes such as curry. Women are generally responsible for the cooking of lentils in the home. Lentils are probably eaten mainly at home. Lentils are eaten for lunch and dinner. Lentils are purchased in specialized ethnic shops which cater to different ethnic communities.

Information About Evaluative Beliefs

4.1 Price, quality and availability influence the consumer acceptance of lentils. The low fat and high protein attributes of lentils are also important. These beliefs relate to sensory, economic, compositional and other attributes of pulses.

Other Information Obtained

Other sources of information were suggested by the public officials during the interviews (e.g. literature references, names of restaurants, location of markets, names of leaders of associations).

Appendix 29: Summary of Results from Observations and Informal Interviews in Retail Markets (Study 3)

Note: Numbers used in this appendix are cross-referenced to the topics in Appendix 13.

Information About Cultivars

1.1 One or more types of lentils were sold in the 20 stores where initial observations were made. Laird, Eston and small Egyptian lentils were available as a whole pulse in Edmonton. A split and dehulled form of large Kenyan and small Egyptian lentils was also available in Edmonton. In addition to English names, the same pulse was labeled with various East Indian names in one or more of the 20 stores. The names included the following names:

Small Egyptian Lentils ------	Massoor Dal, Masoor, Red Lentils
Laird Lentils ----------	Green Lentils, Canadian Green Lentils
Commercial Lentils ----------	Massor Green
Pigeon Peas ----------	Gunga Peas, Toor Dal, Toor Dal Oily, Tuvar
Hyacinth Beans ----------	Val, Val Dal
Green Mung Beans ----------	Moong, Moong Dal, Moong Chicka
Black Mung Beans ----------	Urid Dal, Udud, Black Maah
Chickpeas ----------	Kabli Chana, Kala Chana, Chana Dall, Chana Dal, Darin Chana Gram
An Unidentified Pulse -------	Chori, Red Chori, Moth (May have been a rice bean or in the mung bean family)

1.2 The word dal usually refers to split pulses but whole chickpeas may also be called dal according to one store keeper. Beans such as kidney beans are not dal.

Dal includes pulses such as green mung beans, black mung beans, Egyptian lentils and chickpeas according to the retailers.

The word gram refers to any form of chickpeas.

(e.g. whole, yellow or brown chickpeas, split chickpeas or chickpea flour).

1.3 A total of 52 samples of pulses were purchased by visiting the 20 stores.

Appendix 29: Summary of Results from Observations and Informal Interviews in Retail Markets (Study 3) (continued)

1.4 The retailers indicated that chickpeas, pigeon peas, Egyptian lentils and green mung beans are the most popular pulses.

The word gram refers to any form of chickpeas.

Information About Consumers (Study 3 continued)

2.5 Six retailers described the consumers of specific pulses by mentioning cultural attributes of the consumers. Age was mentioned by one retailer and language or region of birth in India were mentioned by other retailers.

Information About Conditions for Using Crops

3.1 Pulses were available in the following forms:

Whole Mature Seeds

Milled Seeds ---------- split and dehulled; split, dehulled and oiled, flour

Canned Products -------- green immature seeds, mature seeds, curry, chili, baked beans, soup, bean puree, bean spread

Frozen products -------- green immature seed, mixed bean salad

Dried products --------- soup mix, falafel mix, dried puree, dried immature seed

Other products --------- roasted, toasted or deep-fried seeds or extruded forms with seasonings added, papads

Pulses are used to prepare soup, dal, curry, papads and various toasted or sweet snacks.

3.2 Most crops in the pulse category were sold only as a whole seed. Only two lentil cultivars (Egyptian red lentils and large green Laird lentils) were available in stores that specialize in East Indian foods.

Lentils were not available in as many processed forms as mung beans, pigeon peas, chickpeas and Canadian peas. Whole chickpeas, cowpeas, kidney beans (light and dark red), lentils, mung beans (black and green) and pigeon peas were sold in five stores that specialized in the sale of East Indian foods.

Appendix 29: Summary of Results from Observations and Informal Interviews in Retail Markets (Study 3) (continued)

Information About Conditions for Using Crops

3.3 Consumers boil pulses until the pulse disintegrates or until the pulse is soft but still shaped like a seed. Some people like a thinner or wet dal and others like a thicker or dry dal. Spices may be added while the pulse is being cooked or after it has been cooked. Consumers may use a pressure cooker. Cooking is the woman's responsibility in the family.

Information About Evaluative Beliefs

4.1 Flavor and texture were mentioned as advantages or disadvantages of some pulses. These beliefs are related to the sensory attributes of pulses. In talking about texture, retailers mentioned the consistency (wet or dry) or the extent to which the pulse seed retains its shape or disintegrates.

Appendix 30: Summary of Results from the Informal Interviews with 7 Frequent Users (Study 4)

NOTE: Numbers in this appendix are cross-referenced to topics in Appendix 13.

Information About Cultivars

1.1 In addition to the names reported in the results of the market observations, the following names were used to refer to some pulses:

Red Kidney Beans ---------- Rahj Mah
Pigeon Peas ---------- Arhar
Green Mung Beans ---------- Moongi
Green Canadian Peas ---------- Matar

1.4 Most respondents had used between 11 and 22 of the samples. [illegible]st had frequently used between 3 and 7 samples. Black beans, pink beans, Malawi pigeon peas, faba beans (large and small), broad beans, small lima beans and whole hyacinth beans were not used by any of the Frequent Users.

The following 20 pulses were used frequently by at least one of the respondents:

WHOLE PULSES - small navy beans, small red kidney beans, yellow peas, green peas, motth, black mung beans, green mung beans, yellow mung beans, cowpeas, brown chickpeas, yellow chickpeas, small Egyptian lentils.

SPLIT PULSES - yellow chickpeas, green peas, dehulled and oiled pigeon peas, black mung beans, washed black mung beans, green mung beans, washed green mung beans, dehulled small Egyptian lentils.

The following pulses were used frequently by at least 2 respondents:

WHOLE PULSES - green mung beans, brown chickpeas, yellow chickpeas.

SPLIT PULSES - yellow chickpeas, oiled pigeon peas, washed black mung beans, small Egyptian lentils.

Most respondents used pulses twice a month or once every 2-3 weeks.

Appendix 30: Summary of Results from the Informal Interviews with 7 Frequent Users (Study 4) (continued)

Split yellow chickpeas, whole brown chickpeas, whole yellow chickpeas, split oily pigeon peas, whole green mung beans, split washed green mung beans, split Egyptian lentils, split yellow peas and split pigeon peas were used most frequently by most respondents.

Crops prepared frequently were prepared daily, once a week or twice a month for 5 respondents. "Frequently" was once every 2 to 3 months for 1 respondent. Not frequently was once a week, rarely, once a month or once every 2 weeks for 7 respondents.

Information About Consumers

2.5 Most respondents were in Canada between 3-15 years. One respondent was born in Canada. Most appeared to be between 20-35 years old. Respondents were from North or South India and East Africa. All were married. Some lived alone, some lived with a spouse and children. Most were homemakers, others were employed out of the home or were students.

Frequent Users who were contacted through leaders of the Council of India Society had used 23-25 of the 46 pulses. Frequent Users contacted through the Ismaili Association had used fewer (9-19) samples. Frequent Users contacted through the Council of India Society were born in India. Frequent Users contacted through the Ismaili Association had lived for an extended time in countries other than India and most were not born in India. They were born in Fiji, Britain, East Africa and South Africa. All respondents were women who had cooked dal or sambar and who did most of the cooking for the household.

The first three respondents indicated that they had used all of the lentil samples. As seven of the whole lentils and two of the split lentils were not available on a commercial basis, the practice of showing respondents the set of 15 lentils was discontinued.

The respondent who was an MSc Home Economist from India knew a range of names for all dals she had used. These names corresponded to those that were obtained from the literature and cookbooks as well as from market observations and interviews in Study 3. Some respondents confused the following samples with other samples.

Appendix 30: Summary of Results from the Informal Interviews with 7 Frequent Users (Study 4) (continued)

Information About Consumers (Study 4 continued)

Actual Name of Sample	Name Given By Some Respondents
Split and Dehulled Eston Lentil	Toor (Pigeon Peas)
Laird Lentils	Toor
Washed Green Mung Beans	Split Massoor (Split Egyptian Lentils), Split Yellow Peas,
Split Yellow Peas	Split Chana (Split Yellow Chickpeas)
Split Oily Pigeon Peas	Plain Dar, Oily Green Shelled Mung Beans
Black-eyed Cowpea	Black Beans
Adzuki Beans	Red Beans

3.3 Information About Conditions for Using Crops.

Products made from pulses were served with chapatis, roti, idli or rice depending upon the region a person was from or their preferences.

Pulses were boiled in a pressure cooker, or mixed together and cooked until the pulses disintegrated. These products were generally called dal or sambar. If the shape of the pulse was intentionally retained some respondents indicated they were preparing such pulses for sambars, curries and kitcheri.

Cooked dishes that were prepared from dal were described as being runny, watery, thin and wet or stiffer, creamy, thicker and dry.

Pulses are usually eaten at home for dinner, lunch or perhaps for a weekend breakfast. Lentils were prepared in sambar, curries and soups. Women rather than men prepare the food that is served in the home.

3.4 Soup, kitcheri, dry curry, sambar, dal and curry with rice were the dishes that were prepared most frequently from pulses. Sambar or dal, if prepared frequently, was prepared daily, 2-3 times a week or twice a week for three respondents.

The respondents also prepared other dishes from pulses including: salad, toasted snacks, choles, dosai, patties, dumplings, sweet halwa, idli, bhajjis, pakoras, ladoos and stuffed parathas.

Appendix 30: Summary of Results from the Informal Interviews with 7 Frequent Users (Study 4) (continued)

Information About Evaluative Beliefs

4.1 A total of 60 different evaluative beliefs were given by the respondents. The beliefs were classified according to the scheme used for the content analysis study. There were 13 functional, 11 economic, 9 socio-psychological, 13 compositional and 8 sensory beliefs. Two additional beliefs related to the geographic origin of the crop or the place where the crop was used.

Between 5-7 evaluation beliefs were given by most of the respondents.

Other information obtained

Pulses are purchased at East Indian stores. Four stores were mentioned and all had been visited in Study 3. The names of other restaurants, associations and cookbooks were obtained from the Frequent Users.

Appendix 31: Summary of Results from the Review of 9 Cookbooks (Study 5)

NOTE: Numbers used in this appendix are cross-referenced to the topics in Appendix 13.

Information About Cultivars

1.1 There are 60 varieties of lentils in India. The common lentils include whole or split and washed black mung beans, green or small yellow mung beans, Egyptian lentils, brown lentils (also called Motth), chickpeas and split peas of various types. Lentils are small and flattish, while peas are larger and rounder-like (Singh, 1976).

1.2 Moong, urad, chana, toovar and massor are dals (Lal, 1976). Grams are pulses with a husk and grams are whole. Dals are grams which have been dehusked and split (Ekambaram, 1974). The word lentils is applied to all varieties of dals or pulses (Lal, 1976).

Information About Conditions for Using Crops

3.1 Dal is a dish that is prepared once a day in India. It is especially prepared in the homes of weavers.

Sambar (sambhar), curry, khichiris (khichidi, khidgeree, kicheri) and dals (dhall, dhal) may contain any of a number of peas and beans. Various pulses may also be used to prepare idli, bhajjis, vadas, rasum, soup, chole, stuffed parathas, dosai, pakoras, samosas, burfies, pak, ladoos, halwa, boondi, and various snacks (sev, chevra).

3.2 Whole or split pulses could be used in many recipes. Lal (1976) indicated dosai may be a breakfast dish.

3.3 Pulses can be cooked to a thin puree, a stiff puree or a soft seed with a distinct shape. Pulses may be sprouted or cooked and mashed. Several snacks may be prepared with chickpea flour. Egyptian lentils are often served to infants, the elderly or people who are sick.

In South India a spicy and thin sambar is served with rice. A thicker, less spicy dal, is served with bread (chapatis) in the North (Singh, 1981; Lal, 1976; Singh, 1976).

Appendix 31: Summary of Results from the Review of 9 Cookbooks (Study 5) (continued)

Information About Evaluative Beliefs

(Study 5 continued)

4.1 Beliefs related to five sensory attributes of pulses were mentioned in some of the cookbooks (e.g. size, color, creaminess, watery consistency).

Appendix 32: Summary of Results from the Observations and Informal Interviews in Restaurants (Study 6)

NOTE: Numbers in this appendix are cross-referenced to the topics in Appendix 13.

Information About Cultivars

1.4 Whole kidney beans, yellow chickpeas, green mung beans and split washed black mung beans, split mung beans (black and green with hull) were prepared and served in some restaurants.

Information About Conditions for Using Crops

3.1 In addition to names obtained in Studies 1-5, four new names were obtained. In the 4 restaurants black mung beans were also called creamed lentils, lentils, black cereal and maha dal.

3.1 At most, 4 different pulses were served in any restaurant. Dishes prepared from whole chickpeas and whole or split black mung beans were sold in 5 restaurants. Dishes from whole green mung beans, split green mung beans and red kidney beans were prepared in some restaurants.

3.3 Pulses were boiled or cooked in a pressure cooker in some restaurants. Dal, Bhair (soup), bhajjis and a pulse dumpling were sold in at least one restaurant. The prepared dishes that were purchased from the restaurants included both wet and dry examples of chole and dal maharani. Dal Maharani, pindi chana, vegetarian bhojan, Dal Makini, Wada, Chole, Cooked Dal, Ladoo, Bean Sticks, Hotty Knotty, Chana, Maha dal, Moong Dal, Dal Makahani, Chana Masala and Filled Pakoras were available from the restaurants.

Other Information Obtained

The restaurants served mainly North Indian dishes that were specialty dishes. The dishes were costly and may not reflect the daily food consumption of East Indian families.

Appendix 33: Samples Used in and Summary of Results from Interviews with 10 Consumers (Study 7)

NOTE: **Whole Cowpeas** and all samples in bold-face print were selected for use in Study 8.

Information About Cultivars

Number of Respondents Who Used This Sample	Name of Sample	Studies in Which Sample was Reported to be Used Frequently **
6	***Whole Yellow Chickpeas**	(3,4,6)
6	***Whole Brown Chickpeas**	(3,4)
6	***Split Oily Pigeon Peas**	(3,4)
5	***Split Egyptian Lentils**	(3.4)
5	***Split Washed Green Mung**	(3,4)
5	***Split Washed Black Mung**	(4,6)
4	**Whole Red Kidney Beans**	(6)
4	***Whole Green Mung Beans**	(3,4,6)
4	***Split Yellow Peas**	(4)
4	***Split Pigeon Peas**	(3,4)
3	**Whole Black Mung Beans**	
3	*Split Yellow Chickpeas	(3,4)
2	Whole Commercial Lentils	
1	**Whole Laird Lentils**	
1	Whole Yellow Peas	
1	Split Kenyan Lentils	
1	Black Mung Beans (Split and with Hull)	(6)
0	**Whole Egyptian Lentils**	(3,4)
0	Whole Pigeon Peas	(3)
0	Split Green Mung Beans (with Hull)	(3,6)

* Indicates samples used at least once a week by 3 or more respondents in Study 7.

** Study 3 = Observations and Interviews in Markets
Study 4 = Interviews with Frequent Users
Study 6 = Observations and Interviews in restaurants

Appendix 33: Samples Used in and Summary of Results from Interviews with 10 Consumers (Study 7) (continued)

Information About Consumers

(Study 7 continued)

Number of Respondents Who Had This Attribute	Attributes of Consumers
9	Have lived in India
8	Came to Canada between the ages of 22-42
2	Came to Canada when they were less than 20 years old
8	Have lived in Canada for more than 10 years
2	Have lived in Canada for less than 10 years
6	Respondent and spouse from the same province in India
10	Respondents spoke English in their house and any of six Indian languages or Swahili
10	Birthplace of respondent and spouse was one of 9 provinces in India or 1 of 2 countries in East Africa
10	Respondent was between the age of 25 and 59
10	Respondent prepared and ate between 15-20 of the crops used in this study
8	Respondent assigned names to samples that corresponded to those on package labels in the markets
1	Respondent identified whole yellow peas and whole Laird lentils as Toor (pigeon peas)
2	Respondent identified yellow peas and split pigeon peas as split chick peas

Conclusion: The method of selecting respondents for this study provided a sample of respondents with a range of demographic attributes.

Appendix 33: Sampl[illegible]Used in and Summary of Results from Interviews with [illegible]onsumers (Study 7) (continued)

Information About Conditions Using Crops

(Study 7 continued)

Number of Respondents in Study 7 Who Mentioned This Dish	Dishes Prepared from Other Pulses (*Indicates dishes respondents did not mention as dishes that are prepared from Egyptian or Laird lentils)
7	*Sweets (e.g. hawla, mysore pak, laddus or besan burfi)
6	Snacks (e.g. sev, boondi or snacks)
5	Pakora
4	Wada, boulee or dahi vada
4	Dal or oosal
2	Samosa
2	*Stuffed roti or purin puri
1	*Chole
1	Sambar
1	Vegetable dish
1	*Dosai
1	*Idli
1	*Kitcheri
1	*Sprouts

NOTE: Soup, rasam and kurtu were mentioned as dishes that were prepared from Egyptian or Laird lentils. These dishes were not mentioned as being dishes prepared from other pulses.

Appendix 33: Samples Used in and Summary of Results from Interviews with 10 Consumers (Study 7) (continued)

Information About Conditions for Using Crops (continued)

(Study 7 continued)

Dishes Prepared from Egyptian Lentils	Number of Respondents in Study 7 Who Mentioned This Dish	Dishes Prepared from Laird Lentils
Dal	9	5
Boulee	1	0
Snack	2	1
Soup	2	0
Sambar	1	0
Rasam	1	0
Fried Dal	1	0
Pakora	1	0
Kurtu	0	1
Oosal	0	1
Vegetable (Bhajji)	0	1
Mixed with other dals	0	1

Appendix 33: Samples Used in and Summary of Results from Interviews with 10 Consumers (Study 7) (continued)

Information About Evaluative Beliefs

(Study 7 Continued)

Number of Respondents in Study 7 Who Mentioned this Evaluative Belief	Evaluative Beliefs Mentioned by Respondents in Study 7 **	
5	*Is Nutritious	(2,4)
4	*Is Easy to Mash Into a Puree After it is Cooked	
4	*Requires a Short Time to Cook	(1,4)
4	*Usually Requires Soaking Before it is Cooked	
4	*Is Easy to Digest	(4)
4	*Is Tasty	(1,3,4)
3	*Served for a Meal or as a Snack	
3	*Is Easy to Sprout	(4)
2	*Is for Guests	(4)
2	Use for Making Dal	(4)
2	*Is Good for Sick People	(4)
2	Use or Use Often	
1	*Gives Wind or Gas	
1	For Children	
1	For Winter	
1	*Is Expensive	(2,3)
1	Cooks with Less Water	(4)

Appendix 33: Samples Used in and Summary of Results from Interviews with 10 Consumers (Study 7) (continued)

Number of Respondents in Study 7 Who Mentioned this Evaluative Belief	Evaluative Beliefs Mentioned by Respondents in Study 7	
1	Use for a Vegetable Dish	
1	Use for Pakoras	
1	Use for Curry	
1	I Ferment This	(4)
1	*Is Often Cooked or Mixed With Other Dals	(4)
0	*My Household is Accustomed to Eating This as a Cooked Dal Dish	(1,4)
0	*Retains its Shape After It is Cooked	(3,4)
0	*Is Easy to Clean and Wash Prior to Cooking	(4)
0	*Is Filling	
0	*Gives Physical Strength	

NOTE: Beliefs in bold-faced print were included in the Predictive measure of crop acceptance for Study 8.

*Indicates beliefs included in the Profile measure of crop acceptance for Study 8.

** (Numbers in parentheses indicate other studies in which this belief was identified.)

Appendix 33: Samples Used in and Summary of Results from Interviews with 10 Consumers (Study 7) (continued)

Other Information (Normative Beliefs)

(Study 7 continued)

Number of Respondents in Study 7 Who Mentioned This Person	Persons Who Would Approve/Disapprove or Would Say it is a Good/Not Good Idea to Prepare Egyptian or Laird Lentils	Categories of Normative Beliefs
7	Self	e.g. members of the household or family
6	Child	
9	Everyone in the house	
2	Dad	
3	Family	
1	Father-in-law	
2	Vegetarians	e.g. persons with dietary restrictions
3	Meat eaters	
1	Families with a person with heart problems	
4	No comment	
1	Ladies	e.g. persons of certain gender
1	Men	
1	People from West Bengal	e.g. persons from specific areas
1	People from North India	

Appendix 34: Summary of Comments Respondents Made During the Questionnaire-based Survey (Study 8)

1. Comments About the Pulse Samples

Even though respondents said they used a sample, canned products rather than a dry pulse were actually the ingredient that they normally used (e.g. canned chickpeas, or red kidney beans).

Some samples were used to prepare several dishes, other samples were used to prepare only one dish (e.g. split black mung beans for dosai or idli).

Some respondents thought split pigeon peas and split yellow peas were split chickpeas. Some respondents also thought Whole Eston and Split Eston Lentils were Green Mung Beans.

Several respondents said they use both oily and non-oily split pigeon peas. Later these respondents indicated that they normally use only one or the other, not both, of these samples.

2. Comments About the Frequency of Consumption for Open-ended Questions About Dishes and Pulses

Respondents said they cooked a sample and then ate that for more than one meal and more than one day.

Respondents said they cooked one sample and then rotated it with the other samples. It was difficult for respondents to estimate levels of consumption for each sample and dish.

3. Comments About Pictures of the Prepared Dishes

The picture of vada, one of several dishes that were classified as Dish 3, was not easy to identify.

Some respondents did not use all of the dishes in one category with the same frequency. For the pictures of Dish 3, for example, respondents ate dosai more often than vada. For Dish 4, respondents ate pakora more often than kachori.

Respondents mentioned that they used pulses to prepare other dishes in addition to the dishes in the pictures (e.g. sprouts, idli, ahndu, purin puri). Respondents gave samples of these products to the researcher. Pictures were taken of these products (see Appendix 24).

Appendix 34: Summary of Comments Respondents Made During the Questionnaire-based Survey (Study 8) (continued)

3. Comments About Pictures of the Prepared Dishes

Respondents purchased rather than prepare Dish 5 and 6 and do not prepare these dishes at home.

Some dishes are served on weekends or are prepared for guests and weddings (dosai, idli, purin puri, vada, ladoo, chevro).

Only split or whole forms of some pulses are used to prepare Dish 1 or Dish 3.

4. Comments About Evaluative Beliefs

The scores on the Easy to Mash, Needs Soaking, Sprouts Easily, Short Cooking Time and Retains Shape scales depended on whether or not the respondent used a pressure cooker or a canned form of the pulse. Responses for these scales also depended on the dish that is prepared. Pulses are soaked and ground for dishes such as dosai, idli, and vada before the dish is cooked.

Many respondents did not report a score on the Is Expensive scale because they did not remember the cost of pulses or did not know the cost of pulses. Respondents purchased pulses in bulk a few times a year or their spouse did the food purchasing for the household. Therefore some scales were confusing as samples were not prepared as Dish 1.

Five respondents commented on the length of the questionnaire and mentioned the number of evaluative beliefs and samples.

Respondents said questions 10 to 17 were "funny" scales. Respondents didn't understand the scales, needed repeated explanations and found it difficult to report the importance of these evaluative beliefs. The importance of a belief was said to depend on which dal was used. It was difficult for respondents to think in general about all of the pulses and imagine that they were preparing all of the pulses as Dish 1.

Respondents said their household may be accustomed to a pulse but perhaps some members of the household (e.g. spouse, children) did not like the pulse.

Digestibility was reported to depend on the cooking method. If ginger, assafoetida, garlic or onions are used the digestibility is [illegible]ered.

Appendix 34: Summary of Comments Respondents Made During the Questionnaire-based Survey (Study 8) (continued)

4. Comments About Evaluative Beliefs

Responses to the scale for whether or not a pulse is served for a meal or a snack depended on the cooking method.

Whether or not a pulse is filling depended on how much you eat or how much water is added to Dish 1.

Open-ended responses for other comments about whole Eston included comments about the following attributes: smell, color, family likes/dislikes, cooking time, texture and taste.

Preparation steps that were mentioned for whole Eston included: soaking, [illegible], using as a dry vegetable or deep frying it for chevro.

Open-ended responses for other comments about split Eston included comments about the following attributes: short cooking time and consistency (thick or watery).

Preparation steps that were mentioned for split Eston included: washing and use as a vegetable.