

History of food acceptance research in the US Army

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Received 12 January 2002; revised 22 February 2002; accepted 27 December 2002

Abstract

The history of food acceptance research by the US Army in Chicago and Natick is reviewed. The review covers the staff of the two research centers, the research programs, and the significant accomplishments of the Army laboratories from the 1940s to the present. Accomplishments begin with the development of the nine-point hedonic scale, and the development of the first Food Acceptance Laboratory. Further accomplishments include studies of sensory psychophysics, food preferences, food choice and food intake. The laboratories designed methods and conducted research on the role of consumer variables in the acceptance of food products and food service systems. Recent work has focused on new scaling approaches, the role of contextual factors and the importance of product expectations. Throughout the period of the review, the Army research has examined the relationship of laboratory acceptance to field acceptance, and the relationship of acceptance to intake.

Published by Elsevier Science Ltd.

Keywords: Hedonic scale; Food acceptance; Food preference; Longterm feeding; Field studies; Context; Expectations; Sensory

Introduction

We have undertaken a review of the history of food acceptance research in the US Army and its impact on food acceptance research in general for a number of reasons. First, the two of us span over 50 years of working for and with the Army laboratories which originated the concept of food acceptance, and which have continued to research, develop and utilize food acceptance methods and theory. Howard Schutz worked in Chicago from 1951 to 1957; Herbert Meiselman worked at Natick from 1969 to the present. In addition, Howard Schutz worked as a contractor with Natick in the 1970s, and has worked as a summer Visiting Scientist at Natick from 1993 to the present. We will present the review chronologically, but not year-by-year. The work was not evenly distributed over this period of time, and during some years relatively less was accomplished. Also, there was a major disruption when the laboratory moved from Chicago to Natick, and we can report relatively little from this period.

This review will cover the first 56 years of food acceptance research by the US Army. However, we cannot be exhaustive because literally hundreds of people have worked at the Quartermaster Food and Container Institute (QMFCI) in Chicago and then the US Army Natick Laboratories in Natick. These people conducted hundreds of research projects and produced thousands of papers and reports. We will include representative papers and summary reports. Both Chicago and Natick had many employees working on a broad range of research and engineering programs. The Chicago laboratory was the QMFCI, and, therefore, was entirely oriented around food. Natick is an equipment laboratory that produces individual equipment for soldiers and other service personnel, and food is one of the research and development programs.

The Quartermaster Food and Container Institute (QMFCI) of the Armed Forces, Chicago, Illinois, USA

Formation of the Food Acceptance Branch 1945–49

In 1944, the Army Quartermaster Subsistence Research and Development Laboratory in Chicago, Illinois,

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established a Food Acceptance Research Branch for the purpose of providing the reliable and valid prediction of the acceptability of various food products and rations. Major Virgil Wodicka, who was assigned to the Quartermaster, and Major George Gellman, who eventually became Director of the QMFCI, recognized the importance of food acceptance to the overall mission of the Army. It was with this orientation that they visited commercial sensory laboratories such as at Seagrams in 1945. They eventually offered the position of Chief of the newly formed Food Acceptance Research Branch to W. Franklin Dove, a biological researcher at the University of Maine, who had written articles relative to human preferences.

The Committee on Food Research, which was formed as an advisory committee to the overall laboratory, sponsored what probably was the first food acceptance conference in December 1945, at which noted researchers from across the country presented papers that widely covered the area of food acceptance in the Army. The food acceptance program as presented at this conference had four main divisions: food habit studies, psycho-physiological studies, organoleptic studies and statistical theory (Committee on Food Research, 1945).

The first addition of professional staff to the Food Acceptance Research Branch occurred in 1948 when Rosaltha Sanders, a physiologist, joined Dove. Other members of the Food Acceptance staff during this period were: Jackie Leavitt, food technologist; Catherine Walliker, food and nutrition specialist; Ruth Epstein, statistician; and Donald Washburn, research analyst.

The food acceptance testing conducted internally was a cross between expert judgments and trained panels, and consumer judgments for the purpose of developing quality specifications for Army rations. The affective methods utilized were almost entirely of the paired-preference nature. Dove published a paper in 1947 in *Food Technology* entitled 'Food Acceptability—Its Determination and Evaluation' (Dove, 1947). This reference is one that those interested in the very early methods will find useful. The use of a difference-preference test is listed as one of the primary testing methods. In this test, differences are first determined and then the different and the same samples are rated for which one is preferred. It was somewhere in the 1945–1947 period that the first panel facility with booths was constructed, which is described in the 1947 paper by Dove. At that time, this facility represented one of the most sophisticated for food product sensory evaluation in the United States.

The primary external research activity, entitled 'Appetite Levels of Food Consumption,' was related to monitoring a large number of regional food habit studies conducted by universities across the country (Dove, 1943). This involved data collection on regional national likes and dislikes for a national list of foods. Information was obtained on preference using a paired preference technique, the preferred method of preparation, mode of serving, preferred

varieties, brands, or kinds, and the favorable and unfavorable combinations of psycho-physiological effects attributed to each.

The Food Acceptance Branch 1949–1962: staff

In 1949, there was a major administrative change in the Food Acceptance Research Branch and Dove and Sanders left the Institute (Table 1). Dove took a position at the University of Illinois and developed an affective scale utilizing Dove units that, to the best of our knowledge, never received wide acceptance in the field. In 1949 David Peryam was hired to head the Food Acceptance Research Branch, coming from the Seagram Laboratories where he had been in charge of the quality control program. David Peryam was a psychologist and his hiring began the era, in the Food and Container Institute and perhaps in the field of food acceptance in general, of the role of psychologists in food acceptance research. Certainly this is true of applied food acceptance research; however, researchers in universities at this time were doing basic research in the areas of taste, olfaction and food preferences. David Peryam was joined shortly by another psychologist from Seagrams, Norman Girardot.

David Peryam and Norman Girardot were joined in subsequent years by a large number of psychologists and professionals in related disciplines to build what, at that time, was the largest collection in the world of researchers working on both theoretical and applied areas in food acceptance, appetite, and hunger. In early 1951, Frank Pilgrim, a psychologist and chemist from the University of Pittsburgh joined the Branch to head up the psycho-physiological area, followed shortly by the junior author who had just finished all of his coursework for the MS at Illinois Institute of Technology in Experimental and Physiological Psychology. In 1952, they were joined by

Table 1
Chicago personnel working in food acceptance

Arranged in alphabetical order, with degree and university where available, and approximate dates of service at Chicago

Joseph Bradley (PhD, Pennsylvania State University), 1953–55
Franklin Dove (PhD), 1945–49 d
Jan Eindhoven (MS, University of Hawaii), 1952–63
Norman Girardot (MS), 1950–53 d
Joseph Kamen (PhD, University of Illinois), 1955–64
Beverly Kroll 1953–64
Donald Paul (PhD, Illinois Institute of Technology), 1956–57
David Peryam (PhD, Illinois Institute of Technology), 1949–64 d
Frank Pilgrim (PhD, University of Pittsburgh), 1951–62 d
Elsie V. Raffensberger (MA, New School of Political and Social Research), 1954–56
Rosaltha Sanders (PhD), 1946–48 d
Howard Schutz (PhD, Illinois Institute of Technology), 1951–57
Richard Seaton (PhD, London School of Economics), 1955–57
Verona W. Swartz (MS, University of Chicago), 1949–51

d—Deceased.

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