

Chapter 110

The Lingering Impact of Negative Food Experiences: Which World War II Veterans Won't Eat Chinese Food?

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Abbreviation

MRE Meal-Ready-to-Eat is a self-contained, individual field ration in lightweight packaging bought by the United States military for its service-members for use in combat or other field conditions where organized food facilities are not available

110.1 Introduction

How do long-term negative experiences shape long-term food habits? Napoleon famously said, “An army marches on its stomach,” yet relatively little attention has been devoted to food in contrast to the tactics and strategies of great battles. There is abundant research demonstrating the immediate short-term influences various environmental cues have on food preferences (Wansink 2006). In contrast, very little research has investigated the long-term impact of how a person's food preferences are shaped by their first experience with a food. To better understand and predict people's preferences for different types of foods, it is important to understand the origin of their preferences. This chapter investigates some of the responses American soldiers had to foods they ate during World War II and how their preferences and consumption of these foods changed after they returned to their homes.

This chapter is structured as follows. Using archived survey data collected during World War II, we will determine the most favored and least favored foods served to soldiers in combat, along with how much of them they consumed. Following this, we will review a longitudinal analysis of food consumption patterns of soldiers who were exposed to unfamiliar (Chinese) food while in combat. The combination of the two patterns of data will provide insights as to how food preferences might change under the stress of combat as well as the lingering consequences it might have on preferences and food intake (Wansink et al. 2008).

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110.2 Familiar Foods Among Combat Soldiers in World War II

Perhaps the best record of the eating habits of soldiers in World War II was included in an in-depth sociological investigation of training, living, adjusting, and recovering, which was sponsored by the US War Department's Information and Education Division. It was a system of over 150 classified stratified questionnaires covering five or six times as many issues. Parts of it were subsequently published in *The American Soldier* (Stouffer et al. 1949).

Part of the research investigated preferences for various food items that were included in either K-rations, food served in platoon-sized groups of 30, or food items that were included in C-rations, food served in individual field servings. Whereas K-rations were usually prepared in a field kitchen, C-rations were individually eaten, and were more similar to the Meals-Ready-to-Eat (MREs) eaten by today's soldiers.

In two surveys, one conducted with 402 soldiers in September 1944 (S-160-B) and another conducted with 2,549 soldiers in November–December 1944 (S-177), soldiers were asked about their preference for these items. To assess the types of foods eaten, how much they liked those foods, and how much of those foods they consumed, the raw data from the surveys was obtained from the Department of Defense and they were reanalyzed.

When meals were prepared in Army Field Kitchens, the foods were canned, but were frequently prepared and served hot. When asked if they generally received enough food to eat, 11% of the participating soldiers replied “Always,” 49% replied “Usually,” 39% replied “Usually not.”

When asked about the most common items found in these meals, soldiers were asked to indicate which they liked best and which they liked least. For each food they were then asked to indicate whether they generally ate all of it, part of it, or none of it.

The most and least favorite foods are indicated in Table 110.1. The favorites included cheese (31%), chopped ham and eggs (27%), and beef and pork loaf (11%). The least favorite were crackers and biscuits (25%), cheese (17%), and a three-way tie with chopped ham and eggs, beef and pork loaf, and pork loaf with carrots and apple flakes (7%).

Except for three evocative foods – beef and pork loaf, pork and egg yolk, and pork loaf with carrots and apple flakes – the data in Table 110.2 also show how much these soldiers usually ate of each items.

Although chocolate bars were not in the top 3 of best liked food items, it is a food item that is most likely to be completely consumed (76%), followed by cheese (60%) and cheese and bacon (59%).

Table 110.1 The preference of combat (K) rations served from army field kitchens (in percentages)

Food	Which food items do you like best and which food items do you like least?	
	“Like the best”	“Like the least”
Cheese	31	17
Chopped ham and eggs	27	7
Beef and pork loaf	11	7
Biscuits	7	25
Chocolate bar	6	2
Fruit bar	5	3
Cheese and bacon	3	0
Pork and egg yolk	2	3
Pork loaf with carrots & apple flakes	2	7

This table shows the percentage of soldiers who indicate which food item of the list they “like the best” and which food item they “like the least.” Because of non-response, not all columns sum to 100%

Table 110.2 The intake of combat (K) rations served from army field kitchens (in percentages)

Food	Do you generally eat all of it, part of it, or none of it?		
	“Eat all”	“Eat part”	“Never eat”
Chocolate bar	76	12	7
Cheese	60	24	7
Cheese and bacon	59	22	7
Fruit bar	47	12	15
Biscuits	42	46	6
Chopped ham and eggs	39	12	15

This table shows for each food item the percentage of soldiers who generally consume the entire food item (“eat all”), the percentage of soldiers who only eat part of it (“eat part”), and the percentage of soldiers who never eat the food item (“never eat”). Nonresponses would bring each row total to 100%

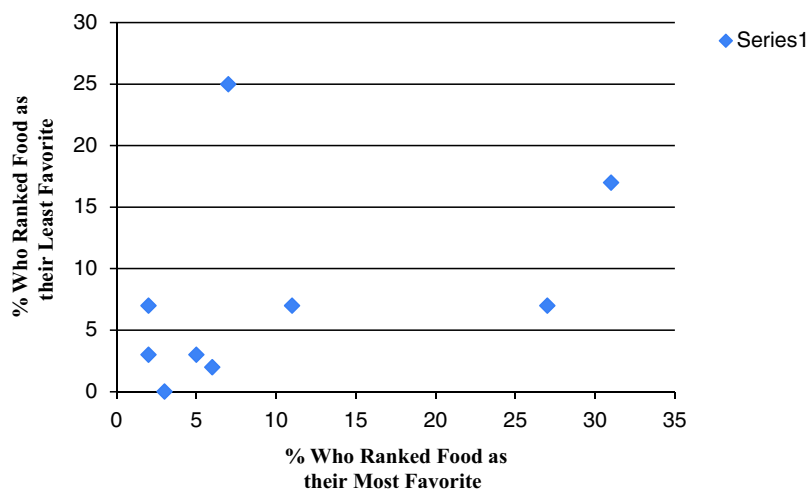


Fig. 110.1 The most favored WWII combat foods are also the least favored. This figure visualizes the relationship between the percentage of soldiers who favor food items the most and the percentage of soldiers who favor food items the least

The least liked food item, biscuits, is also the food item most likely to be only partly consumed (46%), followed by cheese (24%) and cheese and bacon (22%). Finally, there are two food items that stand out as items soldiers indicate they never eat, fruit bars (15%) and chopped ham and eggs (15%). Interestingly, enough, this latter food item is also among one of the best liked food items as well. A couple observations are notable in this data.

First, the same foods were often the most favorite and the least favorite among soldiers. While cheese, chopped ham and eggs, and beef and pork loaf were the three most favorite foods, two of them were also among the least favorite. Many of the other less valenced foods inspired neither love nor hate. Indeed the correlation between a food being the most favorite and it also being the least favorite is 0.45 ($P < 0.05$) (see Fig. 110.1). This strongly suggests there are different segments of background and taste preferences being represented in this data.

There is an expression that one man’s meat is another man’s poison. These data suggest that the inherent food quality of these items is acceptable to good. What causes cheese to be the most favorite of 31% of the soldiers and the least favorite of 17% probably has less to do with the cheese than with the background, taste preferences, and food associations of the soldiers.

A second observation from these data in Tables 110.1 and 110.2 is that those foods that were the most favorite were also those with relatively high nutrient density. Foods that we would think would be quite tasty – such as chocolate bars and fruit bars were among the most consumed foods in the sample (76% reported eating their entire chocolate bar). In contrast, however, these foods were not among the most favorite. While a reinvestigation of marginal notes in the data revealed no explanation, we might hypothesize that either the overriding need of protein or of the comfort of hot food would trump that of only taste.

Similar results were found with C-Rations, which are the rations soldiers carried into the field by themselves. In the individual rations – the canned C-Rations – soldiers' favorite foods were the ones highest in protein and not those that we would have otherwise assumed tasted the best. Their most favorites were meat and beans (51%), spaghetti and meat (13%), beef stew (6%), chocolate (5%), hash (5%), and ham and eggs (2%). The least favorite were hash (32%), beef stew (19%), biscuits (10%), meat (9%), beans (5%), and corned beef (2%).

In this situation, we have been discussing how a combat soldier responded to foods that were – to a great extent – foods they were familiar with before leaving for combat. In other words, their impression and preferences of these foods had already been formed, and there were associations they had that were independent of the new associations (either negative or positive) that were formed overseas in combat. What we will next examine is the long-term responses to novel or new foods that soldiers were exposed to while in combat.

The soldiers' preference for foods served in combat seems to be related to their previous habits but also to combat-related needs, which explains a preference for energy-dense foods. Energy-dense foods are more satiating providing the energy soldiers needed to accomplish their daily tasks while in the army. But the influence of the army on veteran's lives was not only on the short-term preferences for energy-dense foods; the veteran's experiences during war shaped their food preferences in the long-run. Previous research on the food preferences of children reveals that bad experiences due to the consumption of a food (such as nausea) may lead to food aversion for many years. Our research demonstrates that the context in which a food is consumed can influence adult's food preference and aversion in the long term.

110.3 The Lingering Determinants of Food Preference

Being overseas in World War II opened up the culinary world for many Americans. Indeed, Italian, French, and German food may have tasted fairly good for many returning veterans. They found jobs, started families, and the idea of spaghetti or a bratwurst was not as strange – not as “foreign-sounding” – as it was 5 years earlier (Wansink 2002). Yet compared to the taste of the meat and potato-like cuisine of the Europeans, learning to appreciate Asian cuisines, such as Chinese and Japanese food would have seemed more extreme (Scott and Downey 2007). Asian food was unlike anything most of them had ever eaten (Chin 2005). Why then, did some Pacific veterans learn to love Chinese food and others hated it – even 60 years later?

Part of this could be related to a person's food adventurousness (Stallberg-White and Pliner 1999) or to food neophobia (relative aversion to new foods). Yet another part, however, could be related to country-specific associations (Brunstrom 2005). More specifically, animosity towards foreign countries – the remnants of antipathy related to previous or ongoing military, political, or economic events – may influence different people in different ways. For instance, Klein and Ettenson (1998a, b) found animosity influenced willingness to buy Japanese products in the Chinese city of Nanjing,

where 300,000 civilians were killed by the Japanese in World War II. Similar results from World War II were found by Nijssen et al. (1999), who examined the animosity of Dutch consumers toward Germans. Such visceral experiences may also lead to biased preferences toward these relatively unfamiliar foods.

What is not clear is what causes these biases. There are numerous anecdotal accounts of Vietnam veterans returning to the US with newfound preferences for Asian foods. Yet there are also many accounts of other Vietnam veterans having a powerful aversion to any casserole or meal containing rice. This aversion might be less related to a veteran's personality (such as his adventurousness) than about his experience in the war.

Consider how Chinese food might have been perceived by American veterans of World War II. Although China was an American ally during the war, Chinese food was an unfamiliar food that many Pacific veterans may have largely associated with battles against Japan (Stouffer et al. 1949). For such veterans, the associations they have with Chinese food may have been viscerally influenced by whether their experience in the Pacific are recalled as favorable or unfavorable (Nordgren et al. 2006). For instance, those experiencing intense or frequent combat may let this unfavorable experience negatively bias their long-term perception of Chinese food, or of any Asian food they see as similar (Japanese, Thai, Korean, and so forth). For those who were more removed from the negative associations with combat, there should be less stigma. In contrast, combat experience for a European veteran should have little influence on their perception of Chinese food because there were no proximate negative associations with it.

110.3.1 Investigating Food Preferences in World War II Veterans

To examine the long-term consequences of combat experience on preferences for unfamiliar foods, the homogeneous focus of the sample was American World War II veterans (Wansink et al. 2009). A random selection of 5,000 names of veterans born before 1928 was obtained from US census data. In the year 2000, each veteran was sent a survey, a cover letter, and a business reply return envelope. The cover letter asked them to complete the survey. In return, a small donation was made to the World War II Memorial, they were sent a copy of the major findings of the project, and they were invited to a symposium – Consumer Camp™, then at the University of Illinois at Urbana-Champaign (now at Cornell University) – that discussed the results of the project.

To determine their experience in combat, respondents were first asked to indicate whether they had experienced combat while serving during World War II. Those who responded “Yes,” were then asked to note the frequency (1 = infrequent; 9 = frequent) and the intensity (1 = low intensity; 9 = high intensity) of their combat experiences. Veterans were classified as having had a high level of combat experience if the average of their summated score was higher than the mean (6.1 out of 9).

Veterans were then asked to indicate their preference toward Chinese food and their preference toward Japanese food (1 = dislike very much; 9 = like very much). To be able to examine these preferences independent of their general predisposition for variety and adventure, respondents were asked to rate their general level of adventurousness immediately following the war and at the current time (1 = not adventurous; 9 = adventurous). An index for adventurousness was calculated using the average of these two measures. Last, demographic questions were asked.

While there are likely to be memory biases that can affect responses, efforts were made to minimize these biases (Bradburn et al. 2004). Based on a pre-study, questions were worded in a way where they could be answered with the least effort and greatest accuracy.



110.3.2 Is Food Preference Related to Combat Experience?

Of 2,376 surveys that were not returned and were assumed to be delivered, 493 veterans personally responded (20.7%). Among these veterans, 76% were between 76 and 80 years of age, 31% had attended at least 1 year of college, 42% were born in a town with less than 10,000 inhabitants, and 41% currently lived in a town with less than 10,000 inhabitants.

The hypotheses were tested using univariate analysis of variance. As indicated in Table 110.3, the preference for Chinese food was higher among Pacific veterans with low combat experience (little to none) than with the Pacific veterans with high combat experience (5.4 vs. 4.2; $F = 8.4$; $p < 0.001$). For European veterans, their combat experience had no impact on their preference for Chinese food ($p > 0.05$). As expected, previous experiences influenced food preference among Pacific veterans, but not among European veterans.

The same analysis of the liking scores for Japanese food provide further support for the view that combat experience affects long-term food preferences. As expected, Pacific veterans with high combat experience had a less favorable opinion about Japanese food than those with little or no combat experience (2.8 vs. 3.5; $F = 3.0$; $p < 0.05$). As was expected, this was not the case with European veterans. Their preferences for Japanese food were unaffected by their level of combat experience (see Table 110.3). The general preference of all veterans for Japanese food was much smaller than towards the more commonly available Chinese food ($p < 0.05$). Figure 110.2 summarizes the main findings.

When aggregating their responses, 31.8% of the veterans generally liked Chinese food (7–9 on the 9-point scale) and 29.2% disliked it (1–3 on the 9-point scale). Their opinions toward Japanese food were generally more negative: 58.4% of disliked it while only 12% liked it.

One's preference for Chinese food or Japanese food could also be partly explained by personality variables such as one's level of adventurousness. Veterans with a higher level of adventurousness may have a higher preference for foreign food in general. It was unclear whether this personality trait would be sufficient to overcome combat experience.

To examine this, combat experience and self-rated adventurousness were regressed upon preferences toward Chinese food and toward Japanese food. The results in Table 110.4 show that both factors are significant predictors of preference for Chinese food for Pacific Veterans. Combat experience remained an important predictor for Pacific Veteran's preference for Chinese food even when accounting for adventurousness. It is important to note, however, that combat experience and adventurousness still explains only 6.1% of the variance of Pacific veterans' preference for Chinese food 60 years after the war. Nevertheless, it is higher than the variance explained among European Veterans ($\text{Adj. } R^2 = 0.004$). The same analysis for Japanese food was not statistically significant for either group of veterans.

Table 110.3 How World War II combat influenced long-term preference for Asian food

	<i>Low combat experience</i>		<i>High combat experience</i>		F test value	Sig.
	Mean	SD	Mean	SD		
Preference for Chinese food						
Pacific veterans	5.4	2.5	4.2	2.2	8.4	0.004*
European veterans	5.1	2.5	4.7	2.8	1.1	0.286
Preference for Japanese food						
Pacific veterans	3.5	2.4	2.8	2.1	3.0	0.041**
European veterans	3.4	2.4	3.1	2.4	0.6	0.449

* $p < 0.05$

** $p < 0.01$, one-tailed test

This table compares the preferences for Chinese and Japanese food between Pacific and European veterans with low versus high combat experience

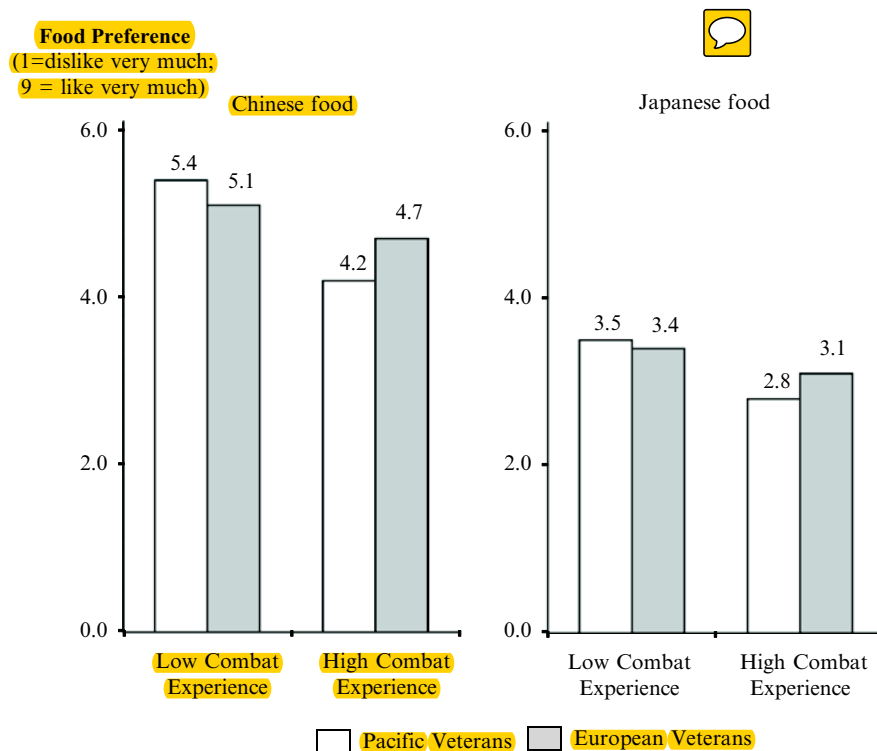


Fig. 110.2 How combat shaped preferences for Chinese and Japanese food. This figure visualizes the differences in preference for Chinese and Japanese food between Pacific and European US veterans with low versus high combat experience

Table 110.4 Combat influenced Asian food preference along with adventurousness

	Level of combat experience	Level of adventurousness	R ²	Adj. R ²
	Standardized beta coefficients	Standardized beta coefficients		
Preference for Chinese food				
Pacific veterans	-0.20*	0.17**	0.07**	0.06**
European veterans	-0.06	0.13	0.02	0.01
Preference for Japanese food				
Pacific veterans	-0.11	0.06	0.02	0.01
European veterans	-0.07	0.35*	0.12**	0.12**

This table compares the effects of Pacific and European veterans’ levels of combat experience and adventurousness on their preference for Chinese and Japanese foods. The results are based on OLS regression analyses

*p < 0.05

**p < 0.01 one-tailed test

110.4 Applications for Food Preference Development

After accounting for demographic differences, there is an egalitarian tendency in nutrition, as in public health, to assume all people’s experiences and preferences are equal. This is often not effective. For instance, it has been shown that fruit lovers have dramatic psychographic differences

compared vegetable lovers (Wansink and Lee 2004), and telling someone to “eat your fruits and vegetables” will backfire with both segments. Similarly, this paper illustrates that the most loved foods of World War II combat soldiers were also the most hated foods by others. This underscores the critical power of segmentation. Another finding shows that the most preferred foods were those that are higher in proteins, suggesting a preference for energy-dense foods among soldiers. This short-term preference for proteins could be explained by their energy needs due to the army activities. Still the army also influenced the long-term food preferences of veterans.

In the development of long-term food preferences, demographic differences are unlikely to explain anything but the most obvious. People from the South like spicy food; people from poor, rural areas like chicken. Instead, the powerful insights are more likely to be based on psychographic differences and experiences.

Of those veterans who enjoyed Chinese and Japanese food and still ate it with some frequency, there were no characteristics they had in common. Before the war, some had lived in big cities, some on farms. Some had graduated from college, others had never seen a 9th grade classroom.

What did explain their preferences was the level of combat they had experienced as soldiers. When analyzing the profiles of those Pacific veterans who liked Chinese food, we did not find Marines who had been at Iwo Jima or infantry soldiers at Guadalcanal. What we found were mechanics, clerks, engineers, and truck drivers – enlisted men who did not experience the War from the front line. Although their wartime experience was a sacrifice, they did not come home with terrible associations that tainted the taste of food even 50–60 years later. It appears the feelings we have when we first eat a food can follow us for a lifetime.

While there is abundant research demonstrating the immediate effects of environmental cues on food consumption, research investigating the potential long-term effects of contextual experiences with a food on preference remains scarce. Research generally examines the effect of specific food characteristics and for instance personality characteristics on food preferences, largely ignoring the very first experiences people had with a food. Ignoring these early experiences may be an oversight. To really understand food preference and the associated consumption behavior, a thorough and complete understanding is desirable. The importance of the first experience with an unfamiliar food on long-term preferences indicates that extra care must be taken when planning the introduction of new foods and new recipes. Changing initial food perceptions is difficult and understanding the influence of the context of the initial exposure to an unfamiliar food may give insights for improving the healthfulness of the food we eat.

Today people are more exposed to foreign foods in their daily lives; it is easy to find a Chinese or a French restaurant in almost every American city. As a consequence, preference for these foods can integrate into an individual’s habits easily. Even so, the context in which a food is consumed for the first time may influence food preferences durably. This is the case when there is immigration. When someone chooses to immigrate to a country the relation established with the food of the new country may be more positive than when this immigration is imposed by political or economical reasons. Further research should look into the effects of immigration experiences and acculturation on food consumption.

Summary Points

- There is abundant research demonstrating the immediate effects of environmental cues on food preference and consumption (Wansink 2006).
- Research on the long-term effects of the context in which people first consume a food on long-term food preference is scarce.

- It is critical to understand all factors shaping food preference.
- The army influenced veteran's short-term food preferences for energy-dense foods and long-term food preferences for foreign food.
- This research demonstrates that traumatic combat experiences shape long-term food preferences, even 60 years after the very first experience with a food.

Definitions and Explanations of Key Terms and Words

Animosity towards foreign countries: The remnants of antipathy related to previous or ongoing military, political, or economic events.

C-ration: An individual canned, precooked or prepared wet ration intended to be issued to US military land forces when fresh food or packaged unprepared food prepared in mess halls or field kitchens was impractical or not available and when a survival ration was insufficient.

Food adventurousness: The self-reported frequency of trying unfamiliar foods on a scale ranging from "never" to "most of the time."

K-ration: An individual daily combat food ration which was introduced by the US Army during World War II.

Long-term food preference: An individual's enduring liking of a particular food.

Mood: A relatively long lasting, affective or emotional state.

Neophobia: The fear of new things, foods or experiences.

Ration: The food allowance for 1 day (especially for military service personnel).

Stress: A state of mental or emotional strain or suspense.

Key Facts About Food Preferences

1. There is abundant research demonstrating the immediate effects of environmental cues on food preference and consumption (Wansink 2006).
2. Research on the long-term effects of the context in which people first consume a food on long-term food preference is scarce.
3. It is critical to understand all factors shaping food preference.
4. Immediate energy needs seem to influence short-term food preferences.
5. This research demonstrates that traumatic combat experiences shape long-term food preferences, even 60 years after the very first experience with a food.

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