Lexical conflation and edible iconicity: Two sources of ambiguity in American vernacular health terminology*

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Abstract

Examination of lexical items in naturally occurring vernacular prose shows patterns of ambiguities in how Americans discuss health issues. Samples from the Freiburg–Brown corpus of American English and varied registers of popular health writing found online reveal two principles of naming beliefs that crosscut the uses of many ambiguous terms: the semantic principle of ‘lexical conflation’ and the semiotic principle of ‘edible iconicity’. Both are shown to reflect sources of nutritional conceptualizations. Lexical conflation is illustrated by uses of fat, cholesterol, sugar, oil, and germ, with modifiers shown to help disambiguate terms. Edible iconicity, where meaning is attached to the visible form of what is ingested and characteristics of a food are believed to transfer to the person who eats it, is illustrated through aspects of hard, white, and hot. Applications are suggested that take into account the influence on nutritional choices that can occur when lay people misinterpret specialized information as signifying a nonspecialist sense. Recognition of these two principles has the potential to affect public health policy by helping practitioners to identify and modify ambiguous words, and to take into account tendencies to interpret metaphors literally, especially regarding iconic ingredients and their presumed effect upon the body.

Keywords: ambiguity; metaphor; nutritional beliefs; public health; terminology.

1. Introduction**1.1. Terminology in medicine and nutrition**

It is often assumed that access to information will allow people to make more informed, and hence healthier, nutritional choices. Recent studies, however, e.g., Henwood et al. (2004) and Zeng et al. (2002), raise questions about whether we should assume that most people seek to be informed consumers, and whether improved decisions are, in fact, a consequence of informed consent status. These studies note that simply having access to information sources does not guarantee that people will go on to pursue or obtain that information, or that they will know how to evaluate it. The present paper suggests a further twist: that even when people might feel nutritionally informed, they can make poor food choices due to the influence of unrecognized ambiguities in the names of the concepts discussed.

That is, while it is no secret that authors in different genres can intentionally signal distinct meanings by the use of the same word, in vernacular discussions of food and nutrition, such multiple meanings can create a danger if consumers misinterpret specialized information in light of nonspecialist interpretations, or miss cues for choosing the intended lay sense. A mismatch between the messages sent by health professionals and those received by the general public can have an immediate—and often detrimental— influence on health-related decisions. As such, word choice can be seen to play a crucial role in public discourse on such issues as nutrition and disease prevention.

In work examining medical discourse, studies have begun to look at the ways that health-related topics are expressed differently by medical practitioners and by lay people. For instance, Boyle (1970), Spiro and Heidrich (1983), and Hadlow and Pitts (1991) noted discrepancies in patients’ understandings of the meanings of medical terms as revealed in responses to

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questionnaires in which patients were asked to choose correct definitions from among false ones. Likewise, studies done by Zeng et al. (2002) and Zeng and Tse (2004) examined the contrast in query terms chosen by lay people when seeking online health information, as opposed to the search terms typed in by medical providers. Such studies show that the terms chosen by these two groups of users for the same health questions would often differ. Differences in starting terms can, in turn, cause frustration for consumers who may consequently not find relevant information online; likewise, using different category terms for the same complaint may also raise important issues for consistency in records indexing. But a further danger comes from consumers who do indeed find information, but then misinterpret apparently common terms as having only one nonspecialist meaning.

In other studies looking at materials making up a corpus of medical texts, Campbell and Johnson (2001), Vihla (1999), and Wermter and Hahn (2004) have focused on determining whether distinct syntactic characteristics exist for medical provider discussions (that would, for example, prevent them from being analyzed with existing computational parsing and tagging tools). In addition, previous text analyses have looked at the variety of registers used strictly by medical providers, such as those inventoried by Habert et al. (2001), which include medical narratives, discharge summaries, imaging reports, and scientific articles.

The goal of the present study, however, is to examine inconsistencies at the lexical level in how Americans in general talk about health, setting up future applications that could pinpoint any contrast that shows up in the usage of terms in both provider and lay texts. Some health-related terms, for example, are used by lay people in ways that are less quantified than the sense intended by diagnosticians: e.g., *obese*, *depressed*, or *hyperactive*. Previous research on medical discourse has examined lay understanding of specific medical terms, such as *hypertension* (Blumhagen 1980; Spiro and Heidrich 1983; Rueda-Bacilig and Florencio 2003) or nutritional concepts like *portion* or *healthy* (Holm 2003; Rozin et al. 1996). These studies found separate interpretations used in professional and lay domains. Beyond merely adding to the list of such differing definitions, however, a more pressing need exists to track down the larger linguistic mechanisms by which meanings for identical terms can diverge. The focus of the current project, therefore, is not on recognized medical terminology, but rather the identification and analysis of the ways in which certain words, which are taken to be non-specialized terms, can show ambiguity.

1.2. Methodology and organizing principles

Because the focus here is on terms not taken to be items of medical terminology, the methodology calls

upon an examination of multiple sources of naturally occurring, nonspecialist texts that discuss health issues. Rather than data gathered by overtly questioning patients on what they think a term means, the examples are gathered from varied types of previously produced contemporary prose, in order to capture more natural and revealing uses of the terms from within public discourse. This article derives from a pilot study of the issues. A larger ongoing project is underway to amass a structured corpus of different registers of discourse about health in order to gather ambiguous terms along with a more complete description of their contextual settings. That corpus is envisioned as comprising four subcorpora representing different registers of language: First, a lay corpus of vernacular language material on health issues. This subcorpus will be composed of materials by and for the general public (e.g., transcripts of call-in radio conversations, fiction, personal blogs, first-person magazine writing, newspaper collections of reader tips, and alternative medicine ads). A second subcorpus will contain popular prose, consisting of reporting whose audience is the general public (e.g., newspaper food and nutrition columnists such as Jane Brody, nonfiction books such as *Fast Food Nation*, diet books, encyclopedia entries, and news reporting). A third specialist subcorpus consists of texts targeted at professional support for medical providers/dietitians/nurses (e.g., medical journals, Physicians Desk Reference, Food and Drug Administration rulings, and American Dietetic Association guidelines). The fourth subcorpus contains marketing materials produced by specialists—not those in nutrition or medicine—but in food and pharmaceutical marketing. These are texts targeted at both consumers and medical providers (e.g., print advertising and transcripts of television ads, market research materials, branding and marketing journals). The current study examines only the occurrences of nutritionally related terms found in selections of the written texts from the lay corpus and popular prose material. The focus, thereby, is to track when collocational differences indicate that writers intended separate concepts. These uses were extracted from prose in the Freiburg-Brown corpora of American English, plus preliminary selections of current popular health writing found online.

Employing this approach to exploring lay conceptions of nutrition choices has revealed two principles that crosscut the individual uses of many ambiguous terms. The use of these terms shows that linguistic awareness can be tied to people's conceptions of a wide variety of health-related concepts. By exploring these underlying principles that compare the semantics of related pairs of words, I show how naming beliefs tie together multiple lay descriptions. These descriptions in turn facilitate interpretations that can consequently affect choices in nutrition and fitness.

The first of these principles, which is semantic in nature, I call 'lexical conflation'. It accounts for how the occurrence of two senses for the same term in a language can lead speakers to confuse separate topics. For example, conflation is involved in discussions of *fat*, which could be referring to an ingredient (*dietary fat*) or to a physical attribute (*body fat*); likewise, *cholesterol* might be used to refer to the ingredient in a food (*dietary cholesterol*) or a medical measurement of human blood (*serum cholesterol*). With many such terms, ambiguity can arise in discourses where modifiers are not used with these nouns. Section 2 provides naturally occurring illustrations of this effect involving the English terms *fat*, *cholesterol*, *sugar*, *oil*, and *germ* culled from written texts. Section 3 then provides definitions and illustrations of the second principle, 'edible iconicity', whereby characteristics of a food (e.g., spiciness, rigidity) are discussed by speakers as if they were transferable to the person who eats it. Section 4 presents the initial conclusions regarding the two principles and delineates future steps in the investigation.

2. Nutritional examples of lexical conflation

2.1. *Fat*

The first examples involve the word *fat*. Here the conflation is between the noun naming the lipid material and the attribute of a body carrying too much weight. In other words, these are the two meanings denoted in more technical literature by *dietary fat* and *body fat*; senses easily confused, however, in a discourse where modifiers are not used with these nouns.

Numerous foods can take part in making a person become fat. These include sugars and starches, as well as foods high in fat; in fact, too much of any food, be it carbohydrate, lipid, or protein, can lead to weight gain. However, because of the identical form of the two words *fat*_{Adj} and *fat*_{Noun}, many lay people concentrate on becoming less fat only by eating foods that do not contain fat.¹ The pervasiveness of the connection can be seen in the variety of cultural settings in which the idea appears. For example, this connection was the basis of a 1993 episode of the sitcom *Seinfeld* in which sugary but fat-free yogurt was consumed at high rates, later causing the characters great surprise when they gained weight.² Likewise, Frito-Lay's marketing of reduced-fat snack foods is presented in news reporting as being motivated by the company's willingness to tackle childhood obesity (Koenig 2002). Thus, the pre-existing consumer idea—further reinforced by the marketing of foods such as low-fat yogurt and Chee-tos—is that by eating a low-fat food one will be a nonfat person.

The mistaken interchangeability of *fat* senses has been noted before, as in a citation in the *OED* from 1909, shown in Example (1):

- (1) Fat-formation in the body ... is not to be regarded as a mere accretion or addition of the fat we consume to the tissues of the frame. (*Daily Chronicle*, 8 July 1909)

Ambiguity should not be unexpected, however, because both these senses of *fat* are treated as mass nouns in English and hence they collocate with similar quantifiers, as seen in Examples (2) and (3):

- (2) 'Dietary' *fat*
- Because of its low fat content, it's the only meat I ever serve Frank, and it's the only meat he ever asks for in restaurants. (<http://cookingtips.cookingcache.com/cooking-chicken/avoid-fat-calories-when-cooking-with-chicken.html>; accessed 8 November 2005)
 - Tossing Out High Fat Foods
My first step toward healthy eating was to purge the pantry and forage the fridge for high fat versions. (<http://lowfatcooking.about.com/ub/10/a/3.htm>; accessed 8 November 2005)
 - Common contributors to acid indigestion are: Eating foods with too much fat in them. (<http://www.google.com/search?hl=en&q=%22foods+with+too+much+fat%22+&btnG=Google+Search>; accessed 8 November 2005)
- (3) 'Body' *fat*
- Having too much body fat affects you in many ways. It influences how you look and feel. (<http://www.everettclinic.com/kbase/topic/special/hw252864/sec1.htm>; accessed 8 November 2005)
 - The major problem I see over and over again with competitors is that they carry too much fat, period. In the quest for size (and bodybuilders are getting bigger and bigger) too many carry more fat than muscle. (<http://www.bodybuilding.com/fun/babyboom73.htm>; accessed 8 November 2005)

In Examples (2) and (3), *high*, *low*, and *too much* show how measurement of both dietary fat and body fat are presented in expressions with similar distributions.

In Example (4), on the other hand, the context does not clarify which sense the writers mean to convey. In other words, if conflation is possible in discussions of *fat*—so that the word could be used to refer to an ingredient ([*dietary*] *fat*) or could be meant as a physical attribute ([*body*] *fat*)—how, then, do speakers view the intended outcome of a 'low-fat diet'?

- (4) Ambiguous uses of *fat*
- Combined with a low-fat diet, there's no more powerful way to strengthen your resistance to diabetes (FROWN, f.txts)

- b. And unlike muscle, which is always working and burning energy, fat does not use up any calories while in storage.
'But,' Dr. Hirsch added, 'that doesn't mean it's such a good idea in our times of surfeit to consume and store lots of fat.'
(Jane Brody, 'Personal Health', *New York Times*, 18 December 1996)
- c. = it's such a good idea in our times of surfeit to consume [dietary fat] and store lots of [body] fat.
- d. Introducing ENOVA brand oil. Less of it is stored in the body as fat.
(Fort Worth, TX, newspaper advertising supplement, October 2005)

In Example (4a), for example, is lower fat a cause or an effect? Readers do not know whether the diet will contain foods that are low in fat, or whether it is a diet that will make the dieters low in fat. In (4b), the sentence shows a pivotal use of the same word *fat* serving as an object for two verbs that require two different kinds of objects. This can be spelled out in the paraphrase shown in (4c). Example (4d) also presents an ambiguous use.

This 'input = output' paradigm pervades contemporary society. While it would be easy to fault the general public for caloric naivety, even in the more expert discourses of medical and government literature expressions of surprise can be found noting how obesity in the United States was rising even as dietary fat consumption was decreasing (Taubes 2001; Willett 2002). Thus the [*dietary*] *fat* = [*body*] *fat* paradigm is found lurking under the expectations of many people.

2.2. Cholesterol

A second nutritional word showing effects of lexical conflation is *cholesterol*. The substance cholesterol is produced in the bodies of animals, hence cows and chickens generate it, as do people. While plants do not contain cholesterol, some, like palm trees, are more readily turned into cholesterol in humans when their oil is eaten. The semantic confusion involving the word *cholesterol* turns on the difference between the material found in foods and that found in the human blood stream. In medical discourse, these are differentiated by the terms *dietary cholesterol* and *serum cholesterol*; but again, in common parlance people use the unmodified head noun *cholesterol* for both senses. Questions of identity and causality arise as a health issue, then, concerning whether eating cholesterol after it is made (as from a human eating bacon) has the same health risks as cholesterol that a body makes itself (as from eating palm oil). This is the source of long-standing consumer confusion stemming from the alternating reports of the dangers or the benefits of eating eggs.³ The same 'input = output' model is at play that was seen with *fat*. For example, chicken

bodies contain cholesterol, and so do eggs. What is debated is whether consumption of eggs will cause higher cholesterol production in humans. While the medical effects will be eventually clarified, separate from the science, we can see that using the same term for both sources of cholesterol increases rhetorical confusion in the lay discourse.

The overlap between these senses, too, has been overtly pointed out, as seen in Example (5):

- (5) A lot is made of high and low cholesterol foods, especially in the USA, but cutting back on foods which are HIGH in cholesterol does not make a lot of difference to blood cholesterol concentrations.
(<http://www.icsi.berkeley.edu/~framenet/data/html/anno/anno1980.html>; accessed 8 November 2005)

Examining additional naturally occurring examples of the word reveals that again the two uses are found in similar collocations, with *cholesterol* modified the same way for both senses: people worry that their serum cholesterol is high or low—as in Example (6), and they worry that the food they eat is high or low in cholesterol as well—as in Example (7).

- (6) 'Serum' *cholesterol*
 - a. There is also a rare type of inherited high cholesterol that often leads to early heart disease.
(<http://www.4woman.gov/faq/cholesterol.htm#2>; accessed 8 November 2005)
 - b. My mornings often begin with three eggs and I boast perfect cholesterol levels. Even Alan, who previously struggled with high cholesterol, eats eggs several times a week and his levels are now lower than ever!
(Suzanne Somers, *Eat, Cheat, and Melt the Fat Away*, p. 31, New York: Crown, 2001)
- (7) 'Dietary' *cholesterol*
 - a. Amid a barrage of criticism over the amount of cholesterol in their fries, McDonald's switched to pure vegetable oil in 1990.
(Eric Schlosser, *Fast Food Nation: The Dark Side of the All-American Meal*, p. 120, Boston: Houghton Mifflin, 2001)
 - b. A lot of the staff at the paper ate here, too. For the best tasting cholesterol in New York, saturated fats, bacon and sausage grease flavored starches, Rosie's was the place.
(Winn Schwartau, *Terminal Compromise: Computer Terrorism: When Privacy and Freedom are the Victims: A Novel*, Seminole, FL: Inter-Pact Press, 1991)

In some cases, however, as shown in Example (8), it is unclear which sense is meant. To show where modifiers could be used to disambiguate the term, brackets have been inserted in these examples.

(8) Ambiguous uses of *cholesterol*

- a. In January of this year, we told you about exciting research from Europe, where doctors found that doses of garlic powder appear to have a marked beneficial effect on [] cholesterol.
(FROWN, f.txts)
- b. [] Cholesterol Always Comes From Animal Foods—Never From Plant Foods
(<http://namdhari.faiithweb.com/veg/healthyheart.htm>; accessed 31 July 2005)
- c. Health-giving plant foods have zero cholesterol. [] Cholesterol only comes from health-depleting animal foods, and egg yolks (which are meant to feed baby chicks for 21 days with no other energy) are the worst offenders.
(<http://www.abbeysvegetarianrecipes.com/health-and-fitness.html>; accessed 31 July 2005)

Examples (8b) and (8c)—two quotes from pro-vegetarian materials—underscore the rhetorical exploitation possible via the ambiguity. A further point often obscured in discussions of *fat* and *cholesterol* is that current medical research shows the link to be in the consumption of dietary fat (at least of the saturated kind) leading not to a fat body, but to higher blood cholesterol. Nonetheless, the mnemonic power of *fat* → *fat*, and *cholesterol* → *cholesterol* influences what people commonly recall and act on when naming or choosing foods.

2.3. *Sugar*

Examples of lexical conflation also show up with the polysemous term *sugar*. Here again, modifiers are often unstated. Lay discussions quickly conflate reference to *blood sugar* and, for example, *table sugar*. Due to inadequate understanding of carbohydrate breakdown, many consumers spread bad lay advice to those with diabetes (though more accurate knowledge of carbohydrates has likely become widespread in the wake of Atkins- and South Beach-type diets). Nonetheless, for most people, eating sugary food is considered the only cause of raised blood sugar—though this state can just as easily result from eating a potato (Willett and Stampfer 2002). Thus, again, sugar outside → sugar inside appears to be the working model affecting consumer food choices. This is illustrated in Examples (9) through (11). In Examples (9) and (10), in particular, note the same underlined wording in the two (a) examples and in the two (b) examples:

(9) *Sugar in the body*

- a. High levels of sugar in the blood can seriously affect other body systems, particularly over long periods of time.
(<http://www.hmc.psu.edu/healthinfo/d/diabetes.htm>; accessed 11 September 2005)

- b. Controlling Epilepsy: Science Replaces Superstition (May 1992) Anyone can develop a seizure if given the right bodily insult, such as poisoning or a lack of sugar in the brain brought on by diabetes. . . .
(<http://www.fda.gov/bbs/topics/CONSUMER/CON00142.html>; accessed 11 September 2005)

(10) *Sugar in food*

- a. our research shows that big brand manufacturers are lacing their cereals with such high levels of sugar and salt, that it is no wonder that we have a public health crisis on our hands
(<http://www.irishhealth.com/?level=4&id=5754>; accessed 11 September 2005)
- b. A Tale of Two Tarts
A major difference between this pie and subsequent pies is the lack of sugar in the recipe. While sugar was available in Europe in the 14th century, . . .
(www.godecooking.com/twotarts/twotarts.html; accessed 11 September 2005)

In Example (11), it is unclear which sense of *sugar* the writer intends to convey:

(11) Ambiguous uses of *sugar*

- a. Excess [] sugar depresses immunity.
(<http://www.askdrsears.com/html/4/T045000.asp>; accessed 13 December 2006)

The use of the same term in Examples (9), (10), and (11) reflects the idea that sugar is always one type of entity, an ingredient remaining immutable as it moves from the table to the blood stream. Having distinct vernacular words for each way of encountering sugar could help to make the separate concepts clearer, and help consumers to better understand the relevant parts of their digestive process. Since blood sugar is important for many patients to monitor, it is especially useful to know what foods have a direct effect on it. Tracking the ways that people respond to the naming of ingredients can thus play an important part in public health education.

2.4. *Oil*

The next polysemous word is *oil*. The word *oil* covers a range of viscous fluids: motor oil, olive oil, Oil of Olay, etc. Of interest in nutritional choices is the reputed connection between oil in food and oil on skin surfaces. Many people are familiar with acne first occurring at a time when a person's skin is newly producing the oily substance sebum. Consequently, generations of teens have been told to stop eating such foods as French fries and pizza because oily foods would cause bad, oily skin. Books and Web sites today still reinforce this mnemonically influenced advice. Thus the same paradigm seen with the earlier

examples emerges: oil (ingested) = oil (on the skin surface). Sources that connect these two uses of *oil*, are seen in Example (12):

- (12) a. In those patients with severe acne lesions ... the improvement was normally a gradual and steady process, with perhaps minor interruptions brought on by excessive intakes of oily food.
(<http://www.juniormuscle.com/jmi2003/health/zits.html>; accessed 8 November 2005)
- b. As you have oily hair, wash it every alternate day. Rinse out with LEMON. Try to avoid oily food.
(<http://www.ammas.com/ar/home.cfm?r=va&bid=1519&topicid=1&tid=111750>; accessed 8 November 2005)

While current medical resources can be found debunking the myth of a causal link between oily foods and oily skin, the fact that many materials first start by discussing the purported link is an indication of the prevalence of the association in anecdotal discourse. For example, in setting the stage for debunking the correlation, one dermatologist notes the appeal of 'an intuitive logic to the notion that eating oily foods leads to oily skin and acne' (Shmerling 2006).

2.5. *Germ*

A last example of a nutritionally hazardous ambiguity in English terms is *germ*. The multiple senses of *germ* in English include the meaning of 'seed'/'core'/'kernel', which is used literally when referring to a wheat grain, or figuratively, as in the grain of an idea. A third meaning is that of disease-carrying bacteria. The negative connotations of this latter sense, however, often color the other uses of the word, such that people who willingly eat *wheat germ* are thought to be behaving in a way amusingly, or even dangerously, counter to common sense. The shift toward negative connotation in other uses is seen in Example (13), in which warnings against bacterial germs and germ warfare show the overt negative sense, while in Example (14) a use with only a somewhat negative sense is seen:

- (13) Negative uses of 'bacterial' *germ*
- a. atomic weapons and germ warfare projectiles.
(FROWN, b.txt)
- b. We spend our whole time asking intimate questions of perfect strangers ... 'Are you Sure that your Toilet-Paper is Germ-free?' (D. L. Sayers, *Murder Must Advertise*, p. 69, New York: Harper & Row, 1933)

- (14) Marked or questionable sense of 'ingredient' *germ*

- a. arcane items as wheat germ and carob candy
(FROWN, m.txt)
- b. The GMO corporations like to think of what they are doing as the natural extension of traditional breeding practices, and would like us to think so, too. They also try hard to enforce a public perception that anyone opposed to their business is kooky, doesn't understand science and grows his or her own macrobiotic wheat germ in Birkenstocks. I disagree with both of these presuppositions.
(<http://www.goshen.edu/~sashamd/gmo.html>; accessed 14 September 2005)
- c. She: What is that slop you are putting in my dishes?
He: Granola, wheat germ, soya, lecithin, natural honey. My body is a temple, and I am worshipping it. It's what gives me my energy, my vitality, and my natural disposition. I'm 63 years old, and look at me. Can I fix you a bowl?
She: This isn't going to work. I really don't know you well enough to truly dislike you ...
... but you are just too weird to live with.
(Neil Simon, *The Goodbye Girl*, 1977. 'English Subtitles for DivX Movies', http://www.divxmoviesenglishsubtitles.com/G/Goodbye_Girl_The.html; accessed 8 November 2005)

As seen by loaded adjectives like *arcane*, *kooky*, and *weird* that accompany the term found in Examples (14a), (14b), and (14c), *germ* as an ingredient can be seen as pejorative, too. The concept of lexical conflation suggests that one influence in this pejoration is the connotative influence from different senses of *germ*. That is, while other cultural forces may certainly affect the identity that people signal by making wheat germ their food choice, if this sense of *germ* were named by another term, the referent might be viewed differently.

Section 2 has explored how a semantic issue underlies the conflation of multiple senses for many words, as illustrated with *fat*, *cholesterol*, *sugar*, *oil*, and *germ*. The next section delineates a complementary issue.

3. Examples of edible iconicity

The other discernable language-related principle impacting nutritional choices is semiotic in nature, relating the meanings associated with both images and words. While lexical conflation ties directly to the vocabulary of nutrition, this other component of linguistic confusion is not a terminology problem at all.

Instead, it involves the meaning attached to the visible form of what is ingested. The language use of many individuals suggests a belief that the physical characteristics of a food are manifested in the person who eats it. This concept, which I call 'edible iconicity', is illustrated in discussions of food. Distilled from these is a set of salient characteristics claimed to be connected to physical properties or emotional states. For example, discourse in a given culture may reveal the assumption that eating foods derived from rhino horn will give body parts rigidity, or the belief that eating spicy foods will agitate mood or character. Examination of references to these properties for a variety of foods suggests that some aspects of nutritional choices are based on perceived, often metaphorical, characteristics attributed to ingredients. Conceptually, then, a key question is which properties of the sign itself are considered immutable or transferable.

While the five words discussed in Section 2 each involved a lexical ambiguity, in some cases, particularly the case of *oil*, a similarity in the visual form of the referents can be seen to influence the conceptual overlap as well. This aspect will be further illustrated with four food characteristics.

3.1. *Hard (marketed to females)*

The first illustration of edible iconicity affects the relation of food to fingernails. Consuming hard material, such as ingredients derived from cow hooves, is a widespread idea in American popular health and beauty lore as a way to harden fingernails. Because of this, a well-circulated beauty tip is that one can strengthen nails by consuming gelatin, since gelatin is believed to be distilled from hooves and tendons of cows. This belief is shown in Example (15).

- (15) a. oral ingestion of gelatin significantly increases the degree of hardness of finger and toe nails.
(<http://www.skinbiology.com/fingerandtoenails.html>; accessed 25 September 2005)
- b. The question is: Does eating Jell-O strengthen your nails? Is this a question you might be able to answer?
Eating Jell-O (gelatin is the basic ingredient) or unflavored gelatin does not strengthens nails. Nails are composed of protein with a high sulfur content. All protein you eat is broken down and circulates in your body protein pool (as amino acids) that is used to build and repair muscles, organs and other protein structures like hair and nails.
(<http://www.dietitian.com/nails.html>; accessed 25 September 2005)

Though human nails are formed by metabolizing protein, the appeal of turning hard horse hooves into

hard fingernails is widespread. This idea is prevalent despite the fact that hooves themselves are not originally formed through bovine consumption of Jell-O; cows eat grass and grain, which is turned into hooves, but also into muscle, skin, etc. Hence, hooves are not themselves made of an immutable 'hard ingredient'.

3.2. *Hard (marketed to males)*

One area of life where people often apply very little logic is sexuality. The quest for male 'enhancement' is rampant all over the globe. But one particular version of achieving this goal involves seeking an 'iconic ingredient' (such as rhino horn, tortoise shell, or tiger bone) that will transmit its property of hardness to parts of the body of the person who consumes it. Examples of this belief are shown in Example (16).

- (16) a. Contrary to a universally held Western misconception, the rhino's horn is not widely considered to be an aphrodisiac. Only the Romans (and, nowadays, a few Indians) believed it to have this property, presumably either because it is long, hard and pointed upwards or because the rhino itself is so generously endowed.
(http://depts.washington.edu/silkroad/texts/weilue/notes11_30.html; accessed 13 December 2006)
- b. Another aid used in the pursuit of sexual betterment is Rhino horn, which is popular in Chinese and Korean culture. Apart from resembling an erect penis, it contains high quantities of calcium and phosphorus, which can revive a listless lover. Like those recipes found in The Kama Sutra, the aphrodisiac effects of Rhino Horn are only psychological to those who have a bad diet.
(<http://www.students.emory.edu/HYBRIDVIGOR/issue2/foodsexy.htm>; accessed 13 December 2006)
- c. Elk antlers, ground into pills, were once heavily sought after in Asian countries because they were believed to be an aphrodisiac, along with helping joint pain and increasing energy ... "It all went downhill because of Viagra," said Dennis Salsgiver, a Davison Township farmer who recently sold his elk.
(Chad Swiatecki, "'Love potion' loser: Viagra knocks elk antlers out of aphrodisiac market' *The Flint Journal*, First Edition, Thursday, 22 December 2005)

Discussions involving both the ingredients shown in Examples (15) and (16) illustrate ways by which people hope to make a hard ingredient transfer its property of hardness to their human bodies through

ingestion. As with other iconic ingredients, a kind of 'common sense' is appealed to, presupposing the ability of some aspect of an ingredient to remain unchanged as it moves through the human body.

3.3. White

Besides hardness, another aspect of food that people appear to count on as remaining unchanging is color. In this case a chain of related beliefs is seen. The nutrient calcium can be found in milk. In the body, calcium is used to form teeth and bones. Because teeth and bones are white, and because milk is white, a widespread perception that shows up is that calcium (= teeth and bone material) = white. Although adult cows eat grass, not something white like cottage cheese (and hence green vegetables can clearly be metabolized into bodily calcium), in popular culture, white foods appear more believable as sources of calcium. So while part of the difficulty in promoting the consumption of leafy greens to people interested in increasing their calcium is that a greater bulk needs to be consumed (see the radio broadcast excerpt in Example [17a]), the principle of edible iconicity suggests that part of the issue is also visual. That is, it lies in the unintuitive 'non-calcium' color of green foods. In Example (17b), further indication is seen that white is, by default, associated with calcium. These excerpts show the occurrence of phrases expressing or assuaging surprise that vegetables contain calcium.

- (17) a. CONAN: Can you get enough calcium from green leafy vegetables or do you have to go to dairy products?
Dr. TOSI: The answer is you can do it, but it's very tough. When young women come to me and say, 'I don't want to drink milk, Dr. Tosi,' I say, 'Well, that's fine. It takes about seven to 10 cups of broccoli to equal one cup of milk.'
(*'Women and Osteoporosis'*, *Talk of the Nation*, broadcast 6 August 2002)
- b. What are some calcium-rich foods, and how much of their calcium are we capable of absorbing and holding on to? You can find plenty of calcium in leafy green vegetables ...
you might be surprised to learn that many sea vegetables, nuts, seeds, dried fruits, and even blackstrap molasses all contain significant amounts of calcium.
Quinoa—a surprising source of calcium
Quinoa (pronounced keen-wah) is an ancient grain that has made a comeback in recent years. Its popularity is due in part to the fact that 1 cooked cup quinoa contains as much calcium as an entire quart of dairy milk!

(<http://vegkitchen.com/tips/calcium.htm>; accessed 17 November 2006)

Equating calcium with white is a form of double metonymy. This shows up in the transitivity of a salient attribute, whereby white represents the source, milk (as in Example [18], whereby milk is referred to as 'the white stuff' and 'white gold'), and at the same time, white represents the goal, teeth (see Example [19] where teeth are referred to as 'pearly whites' or 'sparkly whites'); hence, the iconic ingredient that transfers the attribute of milk into the attribute of teeth [calcium] is seen as white.

- (18) a. All About the White Stuff
There is more than calcium to milk. Milk is a powerful nutrient package, packed with 8 major essential nutrients in addition to calcium and numerous nutrients in smaller amounts.
(<http://www.idahodairycouncil.com/whitestuff.asp>; accessed 6 January 2006)
- b. Calcium: White Gold
Milk is only good for one group of people. Dairy farmers and their families. To them, milk is white gold.
(<http://www.dsiegel.com/wiwd/diet/calcium.html>; accessed 6 January 2006)
- c. Hello and welcome to White Gold Dairy, the home of Terrick Holsteins. White Gold Dairy is an 80 cow herd located in Plainfield, Iowa.
(<http://www.holsteinworld.com/WhiteGold/>; accessed 6 January 2006)
- (19) a. But it wasn't so much the fact that he brushed his pearly whites while driving (hey—we've all done it) but more importantly the way in which he performed the cleaning act.
(<http://www.tmg.com/2006/10/02/whats-matt-doing-with-his-toothbrush/>; accessed 6 January 2006)
- b. Pearly whites as a right
The tooth bleaching business is white-hot. A growing number of Americans are treating their 'pearly grays' with products touted as effective whiteners.
(Marilyn Elias, *USA Today*, 14 December 2003)
- c. In New Hampshire, cosmetic dentists combine their skills with their empathy of attaining such an aesthetically pleasing smile to deliver incredible results to their clients. Clients leave the office beaming their sparkly whites.
(<http://www.dental-resources.com/new-hampshire.html>; accessed 6 January 2006)
- d. Calcium White® 25% Bleaching Gel Refill Kit (Ultra Low Sensitivity) Calcium

White's non-acidic pH provides etch free whitening, with free calcium to help prevent decalcification. The teeth feel cleaner and smoother. There is no acid etching and no decalcification of the teeth.

(<http://www.prestocart.com/cgi-bin/order.pl?ref=arthurenke&fm=1>; accessed 6 January 2006)

For varied reasons (including advertising by the dairy industry, textbook explanations of the production of bones and teeth, and the empirically observable color of the raw calcium mineral), many speakers act upon the presumption that bones are white because milk is white because calcium is white. To suggest that other, visually different foods can fit into that chain must consequently often be presented—as seen in such texts as Example (17b)—as a surprising idea that initially counters common sense. Emphasizing only dairy products as a calcium source, and only teeth and bone production as the result of calcium consumption (as opposed to calcium's function in smooth heart pumping and blood clotting, for example) reinforces the iconic ingredient concept. Discussions addressing the separation of the input form of the ingredient and the output of its corporeal form might help consumers to recognize and short-circuit this type of visual equating.

3.4. *Hot*

The last category involves spicy or acidic foods and their purported creation of similar physical or emotional 'hot' qualities. Metaphor analysts have long connected anger with heat and with pressurized containment (see, for example, Lakoff's *Women, Fire, and Dangerous Things* [1987] as well as Rueda-Bacilig and Florencio [2003] on hypertension). This nutritional version of the metaphor involves an iconic ingredient that, because it has a hot or spicy flavor, is believed to cause a hot or spicy temperament. This connection is found in many other cultures as well. The quote in Example (20a), for example, is from a site describing the tenets of Ayurvedic Medicine, an alternative medicine of Indian origin, while Example (20b) is from an American mail-order company, showing that the *spicy* = *angry* connection is found multiculturally. On the other hand, the senses of *hot* are not always treated as interchangeable; Example (20c) demonstrates how *hot anger* and *hot oven* can be used in the same quote, showing that two senses of *hot* can be used separately in the same passage.

- (20) a. if you get too close to fire or heating influences such as anger, hot climate, very pungent hot spices and coffee, all that charges you up. You know people who already tend to be fiery. If they consume alcohol, red meat and coffee, they are all set to explode.

(<http://www.emaxhealth.com/6/1116.html>; accessed 14 February 2006)

- b. Danny Cash's Bottled Up Anger Hot Sauce \$5.95

A sharp serrano-lime bite, a smooth garlic blast, followed by a strong habanero burn. Anger has never tasted so good!

(http://www.sweatnspice.com/Danny_Cash_Hot_Sauces.php; accessed 14 February 2006)

- c. I scared myself by the level of white hot anger I felt and was a bit shocked by the language that came spewing from my mouth. Trying not to cry, or burn myself because all this was happening while I was squatting near the open, hot oven
(<http://www.murrayhill5.net/blog/inmykitchenblog/archives/000328.html>; accessed 14 February 2006)

With *hot*, transitivity is again seen. Lakoff's (1987: 383–390) work on metaphors suggests that speakers think of anger as heat or steam or pressure, pointing out that the conceptual metaphor that *anger* = *heat* is widespread in folk models. We can also see how, through conflation, (spicy) heat = (temperature) heat. Finally, then, it is not surprising that spicy hot is equated with anger. Thus, completing the loop, not only do we see emotionally hot treated as temperature hot, we treat spicy foods treated as real instantiations or stimulants of emotion. That is, the metaphor is treated literally.

4. Conclusions

In this preliminary investigation of ambiguity in vernacular health discussions, the words so far examined are not presented by their authors as terms whose mastery requires special instruction (unlike, for example, words whose multisyllabic or Latinate forms are recognized as specialized terminology, e.g., *partially hydrogenated* or *poly-unsaturated*). From this analysis, the two meaning types appearing in vernacular prose are not necessarily predicted to correlate with specialist and lay senses; rather, their occurrence shows only the existence of distinct senses that are not fully signaled by authors. This current study of ambiguity paves the way for further investigation of the same terms via a corpus study that would seek to describe any systematic variations within different registers of medical discourse. Such a quantitative analysis could examine how the different senses might be distributed. Subsequent steps will investigate the frequency of each of the paired meanings both across different modalities (e.g., online forums, edited prose, face-to-face conversation), and as they might correlate with different types of speakers and audiences (medical providers, consumers, marketers), in order to show the types of discourse in which this conflation

most commonly occurs. In addition, other unintentionally ambiguous lay terms are expected to emerge that follow these same principles, each showing distinct yet sometimes conflated senses (e.g., *stress*, *salt*).

Recognition of possible conflated senses of words and of reliance on interpretation through metaphor and metonymy can be of use in understanding popular discourses about nutrition. On the one hand, an argument of 'name equals effect' is at play in vernacular food discourse. This is due to conflation that can often go unnoticed when healthcare providers or lay people use unmodified nouns. Yet at the same time, an 'appearance equals effect' argument is also seen to underlie discussions of food, with metaphor and belief in iconic ingredients affecting how Americans frame discussions of nutrition.

Furthermore, these two principles can be particularly valuable in framing public health policy. Involving them in an analysis of discourse can help strengthen two areas of public health discussions relating to nutrition: (i) the need to identify—and keep distinct—unmodified senses of ambiguous words; and (ii) the recognition of the tendency shown by many speakers to take metaphoric discussion literally, especially regarding iconic ingredients and their presumed effect upon the body.

Notes

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- 1. This does not take into account any levels of consumer awareness of the subtypes of dietary fat, which distinguish, for example, fats consumed (those added to foods), fats ingested (which could be higher than expected, since they include the fat in which food is deep fried), and fats digested (which could be lower than expected, after factoring in Olestra-type fat substitutes, which bodies do not absorb (Sanford and Allshouse 1998)).
- 2. L. David, 'The non-fat yogurt', episode 71 of *Seinfeld*. First broadcast 4 November 1993.
- 3. This flux in coverage can be observed by the titles for popular reporting on eggs: 'Something to Cluck About: Yes, low-cholesterol eggs—and they're not bad', *Time Magazine* (Sheraton 1988); 'Eat Your Heart Out', *Time Magazine* (Lemonick 1999); 'Return of the Good Egg; Researchers Report That Fears of Cholesterol May Be Exaggerated', *Washington Post* (Kaufman 1999); 'Should You Eat This? It's hard to know—because the news reports keep changing!', *Good Housekeeping* (Hammock 2003).

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