

Current psychology letters

Behaviour, brain & cognition

17, Vol. 3, 2005 | 2005 Varia

What categorization tells us about food representation

Isabel Urdapilleta, Christine Mirabel-Sarron, Rénate Eiber and Jean-François Richard



Electronic version

URL: http://journals.openedition.org/cpl/457 DOI: 10.4000/cpl.457 ISSN: 1379-6100

Publisher

Centre PsyCLÉ

Electronic reference

Isabel Urdapilleta, Christine Mirabel-Sarron, Rénate Eiber and Jean-François Richard, « What categorization tells us about food representation », *Current psychology letters* [Online], 17, Vol. 3, 2005 | 2005, Online since 07 July 2005, connection on 11 September 2020. URL: http://journals.openedition.org/cpl/457; DOI: https://doi.org/10.4000/cpl.457

This text was automatically generated on 11 September 2020.

© All rights reserved

What categorization tells us about food representation

Isabel Urdapilleta, Christine Mirabel-Sarron, Rénate Eiber and Jean-François Richard

Received December 28, 2004 Revised May 5, 2005 Accepted May 26, 2005 On line July 7, 2005 Introduction

Categorization was long considered a reflection of the environment, with little variability from one individual to another. However, it is now studied from a differential perspective and is believed to express specific concepts of the world associated with developmental level, experience and subjects' personal characteristics. As a result, categorization tasks can be used to understand the concepts of groups of individuals in relation to a specific field. It is this perspective that we are taking in this paper, in which we compare a control group with groups of eating disorder patients (anorexia, bulimia). We examine their classification of food items into categories and the properties they express to justify these classifications.

Relationship between categorization and concepts of the world

In response to categorization theories claiming that the content of categories reflects environmental properties, e.g. exemplar theory (for example, Medin & Schaffer, 1978; Medin & Smith, 1984; Nosofsky, 1984, 1986; Smith & Medin, 1981) and prototype theory (Rosch, 1973; Rosch & Mervis, 1975), the theory stating that conceptual consistency is the major characteristic of natural categories was inspired by the first article published by Murphy and Medin (1985). The component properties of categories are linked not only by empirical relationships by also by causal interpretations (birds fly and eat insects, of course, but they also eat insects because they can fly). Therefore, objects placed in the same category are believed to be essentially the same (Medin & Ortony, 1989).

In fact, the categorization task seems to be very sensitive to underlying theories about individuals. Some researchers (Ahn, 1991; Ahn, Brewer & Mooney, 1992; Hayes &

Taplin, 1995; Medin, 1989; Medin, Wattenmaker, & Hampson, 1987; Wattenmaker, Dewey, Murphy, & Medin, 1986; Wisniewski & Medin, 1994) have tested children's naïve theories by giving them information that might influence their categorization judgments. For example, Carey (1985) observes that when children are asked to choose the objects that seem most human to them, they select a toy that represents a monkey more often than a real monkey. However, when told that human beings have moods, they infer that real monkeys, but not toys, have moods. They thus modify their similarity judgment toward these three objects. Keil (1989) tells the children a story in which scientists discover an animal that looks like a raccoon, but which has the internal organs of a polecat and which, moreover, has polecat parents and children. The older the children, the more likely they are to say that this animal is a polecat and not a raccoon, from which the authors conclude that the children are more likely to create categories based on theories of heredity or biology than on animals' visual appearance. The functional properties inferred therefore take priority over immediately perceived properties.

Many studies have been conducted on the basis of this perspective, e.g. the idea that categories reflect one's concept of the world. One field of study concerns developmental research, which investigates babies' and children's conception of physical objects and emphasizes the role of intuitive theories in conceptual development (Carey, 1985; Hayes, Goodhew, Heit & Gillan, 2003; Lautrey & Mazens, 2004; Nelson, 1985; Spelke, Breinlinger, Macomber & Jacobson, 1992). In a related field of study, specialists in the didactics of physics (Vosniadou, 1994) and the didactics of mathematics (Fishbeim, 1994) underscore the importance of naïve theories, constructed on the basis of experience and culture, and the role they play in the acquisition of scientific concepts. All these authors use the notion of conceptual change and show that primitive concepts resist change and often coexist with scientific knowledge. A third category of investigation relates to anthropological research that studies categorization as a function of cultural contexts and examines the differences between natural categories and scientific concepts (see Malt, 1995, for a review of the issue; Lopez, Atyran, Coley, Medin & Smith, 1997; Medin & Atran, 2004) and particularly the differences in category extensions resulting not only from their morphological differences but also from the objects' usefulness (Hunn, 1977). According to the Kamals of the Philippines, for example, the category tree includes small, highly branched plants used to make fire, but excludes plants with a trunk (such as palm trees), which have other uses (their fruit). This population's equivalent for the word tree thus designates any plant used to make fire. As a result of this research, the now widely shared idea gradually emerged that categories reflect not only environmental properties but also objects' functional properties based on how they are used. These functional properties are based on experience, cultural representations (for example, what is considered edible and non-edible) and the expertise acquired in a professional field that makes certain properties more salient and constructs new properties as well. This point of view underlies the notion of ad hoc categorization proposed by Barsalou (Barsalou, 1989; Barsalou & Medin, 1986). For example, Medin, Lynch, Coley & Atran (1997) compared the way three occupational categories (scientists, maintenance workers and landscapers) classify trees and the properties they assign to these classes. The researchers observed major areas of agreement as well as marked differences in the relative importance these occupations attach to the various properties. Landscapers, for example, attach more importance to morphological and ornamental properties than to biological properties, with which they are nevertheless familiar. Previous research in the field of education had shown that experts classify problems differently from novices in the fields of physics (Chi, Feltovich & Glaser, 1981) and mathematics (Silver, 1981). Experts classify problems as a function of the solution principle, while novices group them according to their surface properties (type of object or mechanism, nature of semantic relationships). As such, the differences that appear in subjects' categories when they are asked to classify objects reveal the properties most salient to them and thus the interest, values and concepts attached to these properties. But how does this apply to food representations?

Categorization and food representations

There has been little research into food categorization. However, it is reasonable to assume that these biological categories are relevant when investigating certain aspects of an individual's concept of the world. Studying these real-world concepts seems pertinent because food is a subject of interest to every one of us. Everyone eats and smells food, reads and talks about it, and plans meals. In studies of biological categories, researchers have examined representations of plants and animals (see Lopez, Atyran, Coley, Medin & Smith, 1997) even though few animals and plants are seen on a daily basis. They are not central to the thoughts and activities of most urban dwellers, and much of our knowledge about such categories comes from observation and communication with others, rather than the direct interaction we have with food.

Concerning eating disorder patients, food categories seem particularly pertinent to the food domain because food is a major preoccupation among these individuals. Research that focuses on food preferences (Brown, Waller, Meyer, Bamford, Morrison & Burdith, 2003; Drewnowski, Bellisle, Aimez & Remy, 1987; Lindeman & Stark, 2000; Leung, Waller & Thomas, 2003) demonstrates a rationalization process in the food behaviors of eating disorder patients that leads to singular food practices and exacerbated food behaviors. Food behaviors are associated with very strong concepts among all human beings.

Every culture, every human group has its own cuisine and eating habits and thus a set of representations, beliefs and practices shared by the individuals in the same group. These factors determine classifications and the rules governing food preparation, combinations, gathering and consumption (Fischler, 1990). Cultures, for example, define the parameters for "disgusting," which refers to food that is "not pleasant to think about" (Lévi-Strauss, 1962). The food is rejected, therefore, on a purely cognitive or ideational level, e.g. the very thought of eating the substance provokes revulsion as a result of beliefs concerning its nature, origin and affect on the body. Eating disorder patients, for example, perceive food as "pharmakons," sometimes good for their bodies, but also poisons that can destroy them, make them suffer and be the source of danger. Therefore, one would expect patients with eating disorders to have specific, pronounced beliefs that manifest themselves because these patients do not categorize food in the same way as others.

The differences in cognitive representations among pathological groups

Many studies have shown that pathological groups are distinguished by differences in cognitive processing related to semantic memory, particularly categorization, semantic judgments and access to meaning. These studies, however concern almost exclusively organic disorders, such as brain lesions (Bulla-Helwig, Ettlinger, Dommash & Ebel, 1993; Grossman & Wilson, 1987; Hirst & Volpe, 1988); amnesia (Warrington, 1975); and Alzheimer's disease (Caramazza, Hillis, Rapp & Romani, 1990; Chertkow, Bub &

Camplan, 1992; Dixon, Bub, Chertkow & Arguin, 1999; Fung, Chertkow & Templeman, 2000). A considerably smaller number of studies address categorization, even food categorization (Richard & Urdapilleta, 2004; Urdapilleta, Mirabel-Sarron, Meunier & Richard, 2005; Urdapilleta, Mirabel-Sarron, Heron-Benaicha, & Richard, 2003) in eating disorders despite their importance at the individual and cultural levels.

The purpose of the following experiment is to demonstrate the differences in the way experimental groups categorize food names and the reasons expressed to justify these categories.

MethodsParticipants

A total of 159 French women participated in this experiment in the same conditions of time and place (Clinique des Maladies Mentales et de l'Encéphale, Paris). There were 73 controls and 86 eating disorder patients (38 anorexics, 18 bulimics and 30 anorexicbulimics); the patients' ages ranged from 20-33 years (mean age = 24.7). Patients were divided into three groups using the diagnostic criteria of the World Health Organization (ICD10, Note 1). The BMIs (Note 2) of controls (mean = 20.5), bulimics (mean = 21.1) and anorexic-bulimics (mean = 19.4) ranged from 18 to 22 and the BMIs of anorexics ranged from 15 to 17 (average = 15.8). A questionnaire was used to verify that controls did not suffer from an eating disorder (Eating Attitude Test 40 – Garner & Garfinkel, 1979).

Materials

A typed list of 27 food names, presented in alphabetical order (i.e. Urdapilleta, Mirabel-Sarron, Meunier & Richard, 2005). These foods belong to major food categories noted for their nutritional value, and are consumer products common to any French person. The foods are as follows: Apple, banana, beef, beet, bread, cheese, canned fruits, chocolate, cold cuts, endive, cookie, cream cheese, dessert cream, egg, fish, fruit juice, fruit tart, mayonnaise, milk, muffin, pear, peas, rice, potato, poultry, tomato, and yogurt.

Procedure

The procedure is comprised of two stages: a task in which subjects group 27 food names into different piles (no limit on the number of piles), thereby expressing the similarity of food items in each pile; and a verbalization task.

The instructions are as follows: "You are going to be presented with a list of 27 food names. Your task is to classify the foods that go together – in other words, those that are similar." Then they are asked to "describe each pile and how the foods in each pile are similar."

Data analysis

The purpose of the analysis is to compare the categorizations of food names by the four groups of participants – controls, anorexics, bulimics and anorexic-bulimics – and to understand the reasons for the categories observed.

The categorization task

The participants grouped the 27 food names into a certain number of piles, classifying one after another. The number of piles and the number of food items per pile differed among participants, so we constructed a dissimilarity matrix. We developed the matrix by calculating the pairing frequency for all pairs of food (or object) names, e.g. the number of times two objects were put in the same class. The pairing frequency is a measurement of the proximity of two objects. The more often a pair of objects is placed in the same class, the more stable the association between the two objects. The

similarity index of two objects is defined as the number of times two objects are assigned to the same category. One then constructs a similarity table of "x" columns by "x" rows ("x" being the number of objects, in this case 27). For each pair of objects, one indicates the frequency of this pair in each class, e.g. the number of subjects who put both items of the pair in the same class. The similarity index thus has a minimum value of 0 (none of the participants placed the two objects of the pair in the same category) and its maximum value is N (all participants put the two objects of the pair in the same class). On the basis of this similarity matrix, we then constructed a dissimilarity matrix in order to perform an MDS Multidimensional analysis (Kruskal & Wish, 1991) using SPSS software (Note 4). The purpose of this multidimensional analysis is to search for a configuration of points, here representing food names, in a space of size X in which the distances in this space best fit the perceived distances expressed by the dissimilarity matrix. The ALSCAL algorithm (non-metric Alternating Least-Square sCALing) was used. Two parameters were examined to evaluate the degree of fit between the original data and the final configuration: the Stress S criterion (or Kruskal's Stress) and the RSQ coefficient. The value of S is defined by the following formula:

$$Stress = \left[\frac{\sum_{i} \sum_{j} (d_{ij} - \hat{d}_{ij})^{2}}{\sum_{i} \sum_{j} d_{ij}^{2}}\right]^{1/2}$$

where d_{ij} represents the distance between i and j in the MDS space and Image2

distance that best fits the similarity between *i* and *j*. A lower S means a better fit. According to Kruskal (1964), the goodness of fit is satisfactory if the Stress value is lower than or equal to approximately 10%. This Stress value is indissociable from the RSQ coefficient, which is the correlation coefficient between the dissimilarity (of the original data) and the (calculated) distance between objects in the multidimensional representation space. An RSQ close to 1 means a better fit in the multidimensional representation. The Stress value and the RSQ coefficient allow us to determine the number of optimal dimensions for representing dissimilarities between foods.

We also conducted a hierarchical ascending classification (Euclidian distances and minimal gap or "single linkage") on the MDS axes (Giboreau, Navarro, Faye & Dumortier, 2001), which allowed us to group together foods that have close coordinates in the multidimensional space, meaning they are similarly perceived by the subjects. The histogram of the level index is useful for indicating a certain "natural discontinuity" in terms of distances between objects observed and allows us to interpret the data resulting from the MDS. The histogram of the level index indicates the loss of inertia when an additional class is considered in the partition. A large gap in the histogram indicates the index corresponding to the number of classes that have to be retained (Lebart, Morineau & Piron, 1995).

Verbalizations

Concerning the verbalization of properties common to the names of foods in the same category, the data analysis was performed using Le Sphynx Lexica software (*Note 5*).

During the first stage, the entire corpus was lemmatized: lemmatization involves reducing an initial lexicon to a smaller lexicon. Thus, each written word form is replaced by its base form or root; singulars and plurals are grouped together, the different inflexions of the verb "to be," for example, are replaced by the infinitive, etc. During the second stage, we used lexical statistics and calculated the number of occurrences of words in the corpus. We then constructed a table by food item and by subject. For each food name and a given group of subjects (anorexics, for example), only those properties with an occurrence rate of more than 45% were taken into account. This means that the given property was expressed by at least three out of four participants. Let's take an example: the property, good for the digestive tract, was used 28 times by the 38 anorexic participants for the word, "pear," so it was retained. We present below only those analyses of verbalizations that allowed us to interpret the axes of the MDS analysis. The interpretation of the axes takes into account all properties expressed for all items in a specific category. For example, with respect to the control group and the interpretation of axis 2 in the MDS analysis for fruits and vegetables (C1, C5), three-quarters of the participants verbalized the following properties: "natural, grow, carbohydrates, lipids, fiber, minerals, vitamins, produced on farms and provide calcium."

ResultsThe model's goodness-of-fit to the data

Table 1 presents the variation of the Stress S criterion and the RSQ coefficient as a function of the number of dimensions in the model.

Table 1. Stress and RSQ in relation to the number of dimensions of the MDS mode

Number of dimensions	STRESS				RSQ			
	Control	Anorexic	Bulimic	Anorexic bulimic	Control	Anorexic	Bulimic	Anorexic-bulimic
2	0.06	0.18	0.12	0.16	0.98	0.83	0.92	0.88
3	0.04	0.11	0.09	0.10	0.99	0.89	0.95	0.93
4	0.03	0.09	0.07	0.08	1.00	0.93	0.96	0.94
5	0.02	0.05	0.04	0.06	1.00	0.96	0.98	0.97

With respect to the control group, two dimensions resulted in a highly satisfactory stress criterion (6%) and an RSQ close to 1 (98%). Concerning the three experimental groups, it appears that three dimensions led to an acceptable compromise, with stress criteria of around 10% (anorexics: 11%; bulimics: 9%; anorexic-bulimics: 10%) and RSQs close to 1 (anorexics: 89%; bulimics: 95%; anorexic-bulimics: 93%).

Hierarchical ascending classification

In this experiment, we were interested in the differences manifested by the different groups of participants in their grouping of foods by category. We based this analysis on the classes provided by the hierarchical ascending classification, using as a criterion the cluster level for which the cluster analysis presents the maximum gap.

The experimental groups categorized 11 of the 27 foods differently from the controls. The foods were: bread, canned fruits, cold cuts, cream cheese, dessert cream, fruit juice, fish, mayonnaise, potato, poultry, yogurt. We are now going to examine these classifications in detail.

The control group (cf. figure 1) divided the foods into five categories that included a large number of items (C1: vegetables; C2: cheese and dairy products; C5: desserts; C6: fruits) and one that was more heterogeneous (C4), which included meat, fish, eggs, cold cuts

and accompaniments. There was also a sixth category (C3) that had only one element: fruit juice.

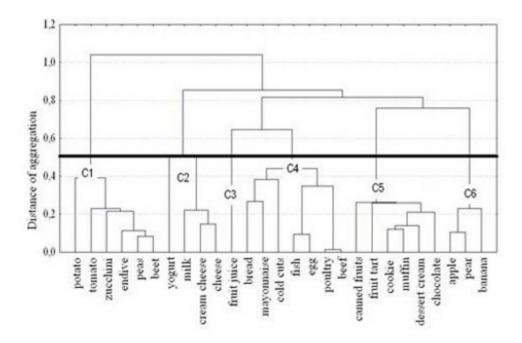


Figure 1. Dendogram of the cluster analysis conducted on the coordinates of the food names on MDS dimensions for the control group.

The anorexic group (cf. figure 2) divided the foods into five categories that included a large number of items (C1: vegetables; C2: cheese, bread and dairy products; C4: meat; C5: desserts; C6: fruits) plus four categories that had one or two items (cream cheese, cold cuts and mayonnaise, dessert cream, potato). The C1 category differed from that of the control group due to the absence of potatoes, which formed a separate class. In category C4, cold cuts and mayonnaise as well as bread were absent. Cold cuts and mayonnaise were in a separate category, while bread belonged to category C2, which included camembert, milk and yogurt. Canned fruits and fruit juice were placed in category C6, which is comprised of fruits. Dessert cream and canned fruits were therefore not included in category C5, the dessert category, and dessert cream thus remained in a class of its own, just like cream cheese.

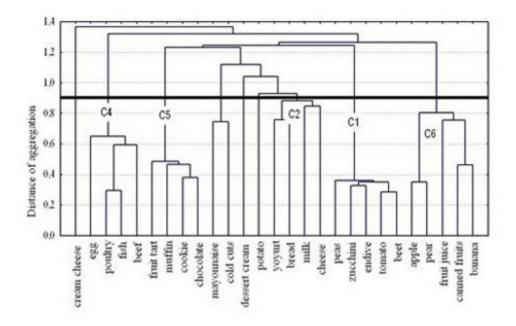


Figure 2. Dendogram of the cluster analysis conducted on the coordinates of the food names on MDS dimensions for the anorexic group.

The bulimic group (cf. figure 3) also divided the foods into five homogeneous categories (C1: vegetables; C2: cheese and dairy products; C4: meat; C5: desserts; C6: fruits) plus three categories with one or two items each (dessert cream, cream cheese, bread and mayonnaise). The mayonnaise and bread were absent from category C4; instead, they make up a separate category. The bulimics, like the anorexics, placed canned fruits and fruit juice in category C6, the fruit category. Dessert cream was a distinct category. Cream cheese was not placed in C2, but in its own category.

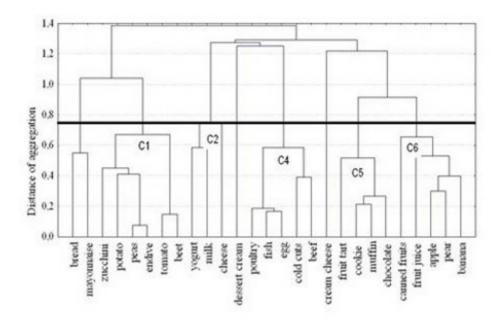


Figure 3. Dendogram of the cluster analysis conducted on the coordinates of the food names on MDS dimensions for the bulimic group.

The group of anorexic-bulimics (cf. figure 4) divided foods into six categories. Fish and poultry appeared in category C1, together with vegetables; as a result, they were absent from category C4. This group, like the anorexics and bulimics, included not only fruit but also canned fruits and fruit juice in category C6. Cream cheese was classified with yogurt; they formed a separate category. Finally, category C4 was comprised of cheese, milk, bread, mayonnaise, cold cuts, eggs and beef.

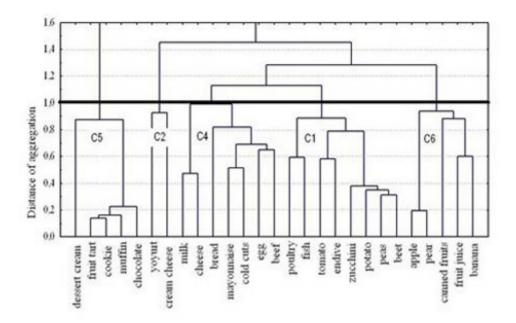


Figure 4. Dendogram of the cluster analysis conducted on the coordinates of the food names on MDS dimensions for the anorexic-bulimic group.

Most of the foods were placed in the same class by all the groups (16 out of 27), but a relatively large number of foods were classified differently. The groups agreed on the following categories: vegetables, beef, eggs, raw fruit (banana, pear and apple) and prepared desserts (chocolate, muffin, cookies and fruit tart). We now turn our attention to the food characteristics that comprise the different groups. The fact that some groups, but not others, place certain foods in a category and vice versa, and the fact that some groups, but not others, exclude certain foods from a category may signify that the properties used for creating consensual categories are not necessarily the same for the different groups. We must therefore examine which properties each group uses to differentiate the categories. To that end, we will use the verbalization data and the results of the multidimensional analysis.

MDS multidimensional analysis

We present below the MDS multidimensional analysis with regard to the verbalizations and hierarchical ascending classifications. They help us distinguish the properties that define the axes. These properties structure the relationships between categories. The classes are indicated on the factorial graphs corresponding to axes 1 and 2 and 2 and 3 (figures 5-11).

Control group (cf. figure 5). Axis 1 contrasts categories (C1, C4) defined by the composition of foods (carbohydrates, complex sugars, animal fats, proteins, etc.), their method of consumption (cooked, raw, cold, hot, as an accompaniment, etc.) with categories (C5, C6) defined by the circumstances of consumption of these foods (any time, in winter, as a snack, in a restaurant, etc.). Axis 2 contrasts natural foods that grow, e.g. fruits and vegetables (C1, C5) that provide carbohydrates, lipids, fiber, minerals and vitamins, with food produced on farms, e.g. cheese and dairy products (C2) that provide calcium.

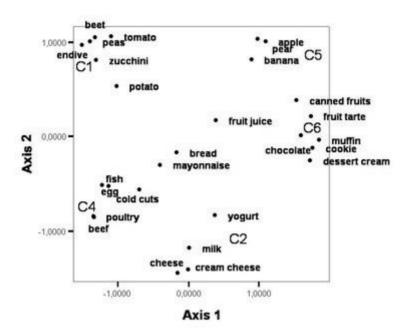
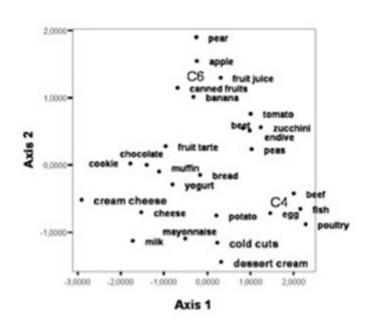
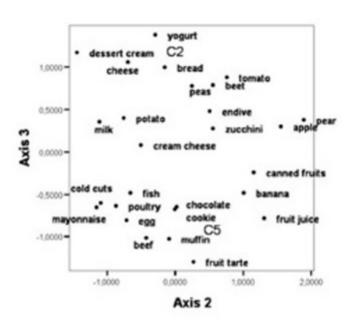


Figure 5. MDS multidimensional analysis of the control group

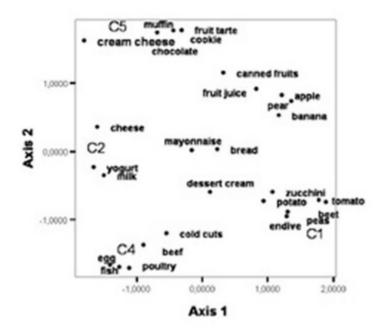
The anorexic group (cf. figures 6 and 7). Axis 1 contrasts cream cheese, an artificial and chemical food with categories defined by the need to consume the foods that comprise them because they are essential for the body (C4: eggs, beef, poultry, fish). Axis 2 is defined by the effect of foods on the body. These are foods that people should eat (fruit (C6) is good for the digestive tract, easy for the body to absorb, beneficial for the body) as opposed to foods that people should not eat (dessert creams and cold cuts). Axis 3 is defined by the right that anorexic patients grant themselves or not to consume these foods (I can or cannot, I must or must not eat them). Yogurt (C2), for example, must be consumed, while fruit tarts and other desserts (C5) must not be eaten.

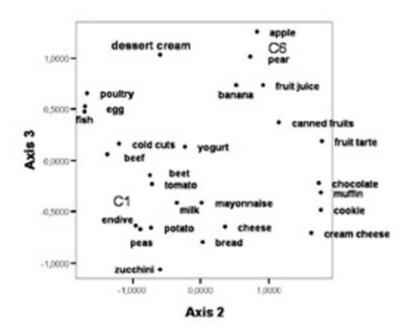




Figures 6 and 7. MDS multidimensional analysis of the anorexic group

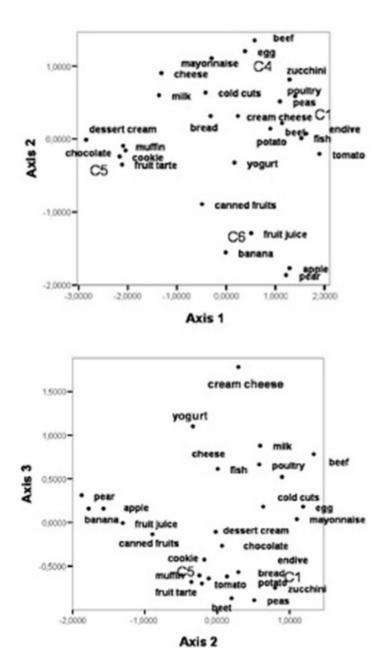
The bulimic group (cf. figures 8 and 9). Axis 1 contrasts animal-based foods (C2: dairy products + cream cheese) that do not need to be chewed and are soft with plant-based foods (C1: vegetables), which must be chewed. Axis 2 contrasts necessary foods (C4: meat and fish) with foods that are forbidden because they are fattening or processed (C5: dessert + cream cheese). Axis 3 contrasts disliked foods that are eaten out of necessity (C1: vegetables) with liked foods that are eaten with pleasure (C6: fruits + dessert creams).





Figures 8 and 9. MDS multidimensional analysis of the bulimic group.

The anorexic-bulimic group (cf. figures 10 and 11). Axis 1 contrasts foods consumed during bulimic binge eating (C5: desserts) with foods consumed during meals (C1: vegetables, fish and poultry). Axis 2 contrasts animal-based foods (C4) that have high protein content but are also high in fat, with fruits (C6), which are high in water and vitamin content. Axis 3 contrasts foods consumed during bulimic binge eating, but which are eaten alone (cream cheese and yogurt), with foods consumed during bulimic binge eating but are eaten with friends and family (C5).



Figures 10 and 11. MDS multidimensional analysis of the anorexic-bulimic group

Conclusion

This experiment provides valuable information concerning the food representations associated with 27 commonly consumed foods. Controls, anorexics, bulimics and anorexic-bulimics take very different properties into account when categorizing food names. The food representations of anorexic, bulimic and anorexic-bulimic patients are based on the consequences of ingestion in terms of weight gain and digestion. But the three groups of patients also differ: anorexics' categorization criteria are guided by deontic properties; those of bulimics by hedonic properties; and those of anorexic-bulimics are associated with the compulsive food behaviors characteristic of these patients. However, all these foods are included in functional scripts by the three groups of patients, e.g. "These foods must be eaten or avoided." The control group's food

categories are very different. They map onto common taxonomic (composition of foods or categorization based on whether they are processed or natural products) and script categories of foods (consumption method and circumstances) evidenced by individuals even at a very young age. For example, Nguyen & Murphy (2003) show that, for children, "eggs and cereal are both in the script category of breakfast foods, not because they are spatially or temporally contiguous (like the leash and dog), but because they play the same part as an event schema (what is eaten for breakfast). Ross & Murphy (1999) demonstrate that while adults assign foods to many different classification systems, they particularly classify them by taxonomic and biological properties as well as properties associated with the consumption context (when the food is eaten, how it's eaten, how it's prepared) – in other words, according to script relations. For example, adults in the study considered a bagel to both bread (a taxonomic category) and a breakfast food (a script category). In fact, food is the only domain we are aware of that has been shown to have both strong taxonomic and script-based categories in adults and children.

We might inquire into the function of these script and taxonomic categories, which seem to be affected by eating pathologies. In fact, based on the work of certain authors (Anderson, 1991; Goldstone & Barsalou, 1998; Phillips, 2000; Rehder & Hatie, 2004; Ross & Murphy, 1999), it can be concluded that categories serve not only to classify objects, but also - and most importantly - to make inferences. According to Ross & Murphy, categories provide responses to such questions as, "What kind of snack can I have at the movie?" and "What would you like for breakfast?" These are questions commonly asked by control subjects and the categories of greatest significance to this population are those that are most relevant to making appropriate choices in furtherance of such goals. But it appears that subjects with eating disorders do not have the same concerns: their inferences about food are associated with their illness and personal experiences: "This food is going to make me fat, give me a stomach ache"; "I have to eat this food when I'm alone" (during binge eating) or "with someone else" (at other times). Therefore, it is reasonable to assume that food pathologies affect not only food categorization but also the scripts associated with it: food representations guide food practices and vice versa - practices also depend on representations, resulting in the differences observed among the experimental groups. Food representations are dynamic; they are based on experience with food and serve as models that determine what is "okay to eat."

We believe that studying the cognitive determinants of eating disorders is a promising avenue for basic research (knowledge of categorization processes as well as such corollary processes as representations, belief formation, etc.), clinical practice (detection of vulnerability or predisposition) and therapeutic practice (best treatment strategies and taking these dysfunctions into account during therapy). Other studies are currently underway to evaluate whether this change in categorization only affects food stimuli or the perception of other objects as well.

BIBLIOGRAPHY

Ahn, W. (1991). Effects of background knowledge on family resemblance sorting: Part II. *Proceedings of the 13th Annual Conference of the Cognitive Science Society* (pp 203-208). New York: Hillsdale.

Ahn, W., Brewer, W. & Mooney, R. (1992). Schema acquisition from a single example. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, 18, 391-412.

Anderson, J. R. (1991). The adaptive nature of human categorization. *Psychological Review*, 98, 409-429.

Barsalou, L. W. & Medin, D. L. (1986). Concepts: static definitions or context-dependent representations? *Cahiers de Psychologie Cognitive*, *6*, 187-202.

Barsalou, L. W. (1989). Intraconcept similarity and its implications for interconcept similarity. In S. Vosniadou & A. Ortony (Eds.) *Similarity and analogical reasoning* (pp. 76-121). New York: Cambridge University Press.

Brown, L.S., Waller, G., Meyer, C., Bamford B., Morrison T. & Burditt, E. (2003). Socially driven eating and restriction in the eating disorders. Eating Behaviors, 4(3), 221-228.

Bulla-Helwig, M., Ettlinger, G., Dommash, D. & Ebel, E. (1993). Perceptual categorization is associated with sensory performance in patients with unilateral cerebral lesions. *International Journal of Neuroscience*, 69(1), 74-84.

Caramazza, A., Hillis, A. E., Rapp, B. C. & Romani, C. (1990). The multiple semantic hypothesis: Multiple confusions? *Cognitive Neuropsychology*, *7*(3), 161-189.

Carey, S. (1985). Conceptual change in childhood. Cambridge, MA: Bradford

Chertkow, H., Bub, D. & Caplan, D. (1992). Constraining theories of semantic memory processing: Evidence from dementia. *Cognitive Neuropsychology*, *9*(4), 327-365.

Chi, M. T. H., Feltovitch, P. J. & Glaser, R. (1981). Categorization and representation of physics problems by experts and novices. *Cognitive Science*, *5*, 121-152.

Dixon, M. J., Bub, D., Chertkow, H. & Arguin, M. (1999). Object identification deficits in dementia of the Alzheimer type: combined effects of semantic and visual proximity. *Journal of the International Neuropsychological Society*, *5*(4), 330-345.

Drewnowski, A., Bellisle, B., Aimez, P. & Remy, B. (1987). Taste and bulimia. *Physiology and behaviour*, 41(6), 621-626.

Fischler, C. (1990). L'homnivore. Paris: Odile Jacob.

Fishbeim, E. (1994). Tacit Models. In D. Tirosh, (Ed.) *Implicit and explicit knowledge: an educational approach*. Norwood, New York: Ablex Publishing.

Fung, T. D., Chertkow, H. & Templeman, F. D. (2000). Pattern of semantic memory impairment in dementia of Alzheimer's type. *Brain and Cognition*, 4(3), 200-205.

Giboreau, A., Navarro, S., Faye, P. & Dumortier, J. (2001). Sensory evaluation of automotive fabrics; the contribution of categorization tasks and non verbal information to set-up a descriptive method of tactile properties. *Food Quality and Preference*, *12*, 311-322.

Goldstone, R. L., & Barsalou, L. (1998). Reuniting perception and conception. Cognition, 65, 231-262.

Grossman, M. & Wilson, M. (1987). Stimulus categorization by brain-damaged patients. *Brain and Cognition*, 6(1), 55-71.

Hayes, B. K. & Taplin, J. E. (1995). Similarity-based and knowledge-based processes in category learning. *European Journal of Cognitive Psychology*, *4*, 383-410.

Hayes, B. K., Goodhew, A., Heit, E. & Gillan, J. (2003). The role of diverse instruction in conceptual change. *Journal of Experimental Child Psychology*, 86, 253–276.

Hirst, W. & Volpe, B. T. (1988). Memory strategies with brain damage. *Brain and Cognition*, 8(3), 379-408.

Hunn, E. (1977). Tzetal folk zoology: *The classification of Discontinuities in Nature.* New York: Academic Press.

Keil, F. C. (1989). Concepts, kinds and development. Cambridge, MA: Bradford Books/MIT Press.

Kruskal, J. B. & Wish, M. (1991). Multidimensional scaling. Beverly Hills, CA: Sage.

Kruskal, J. B. (1964). Multidimensional scaling by optimizing goodness of fit to a nonmetric hypothesis. *Psychometrika*, *29*, 1-27.

Lautrey, J. & Mazens, K. (2004). Is children's naive knowledge consistent? A comparison of the concepts of sound and heat. *Learning and Instruction*, 14, 399–423.

Lebart, L., Morineau, A. & Piron, M. (1995). Statistique exploratoire multidimensionnelle. Dunod: Paris.

Leung, N., Waller, G. & Thomas, G. (1999). Core beliefs in anorexic and bulimic women. *Journal of Nervous and Mental Desease*, 187(12), 736-741.

Lévi-Strauss, C. (1962). Le totémisme aujourd'hui. Paris: P.U.F.

Lindeman, M. & Stark, K. (2000). Loss of pleasure, ideological food choice reasons and eating pathology. *Appetite*, 35(3), 263-268

Lopez, A., Atyran, S., Coley, J. D., Medin, D. L. & Smith, E.E. (1997). The tree of life: universal and cultural features of folkbiolological taxonomies and inductions. *Cognitive Psychology*, 32, 251-295.

Malt, B. (1995). Category coherence in cross-cultural perspective. *Cognitive Psychology*, 29, 85-148.

Medin , D.L. & Ortony, A. (1989). Psychological essentialism. In S. Vosniadou & A. Ortony (Eds.) Similarity and analogical Reasoning (pp. 179-195). New York: Cambridge University Press.

Medin, D. L. & Atran, S. (2004). The Native Mind: Biological Categorization and Reasoning in Development and Across Cultures. *Psychological Review*, 111(4), 960-983.

Medin, D. L. & Schaffer, M. M. (1978). Context theory of classification learning. *Psychological Review*, 85, 207-238.

Medin, D. L. & Smith, E. E. (1984). Concepts and concept formation. *Annual Review of Psychology*, 35, 113-138.

Medin, D. L. (1989). Concepts and conceptual structure. American Psychologist, 44, 1469-1481.

Medin, D. L., Lynch, E. B., Coley, J. D. & Atran, S. (1997). Categorization and reasoning among tree experts: Do all roads lead to Rome? *Cognitive Psychology*, 32, 49-96.

Medin, D. L., Wattenmaker, W. D. & Hampson, S. E. (1987). Family resemblance, concept cohesiveness, and category construction. *Cognitive Psychology*, 19, 242-279.

Murphy, G. L. & Medin, D. L. (1985). The role of theories in conceptual coherence. *Psychological Review*, 92, 289-316.

Nelson, K. (1985). Le développement de la représentation sémantique chez l'enfant. *Psychologie Française*, 30, 261-268.

Nguyen, S.P. & Murphy, G.L. (2003). An apple is more than just a fruit: cross classification in children's concepts. *Child development*, 74 (6), 1783-1806).

Nosofsky, R. M. (1984). Choice, similarity, and the context theory of classification. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 10, 104-14.

Nosofsky, R. M. (1986). Attention, similarity, and the identification-categorization relationships. *Journal of Experimental Psychology: General*, 115, 39-57.

Phillips, V. (2000). Prediction and inference: Roles of the category standard and category-based judgment. *Dissertation Abstracts International: Section B. The Sciences and Engineering*, 60 (8-B), 4267.

Rehder, B. & Hastie, R. (2004). Category coherence and category-based property induction. *Cognition*, 91, 113-153.

Richard, J.F. & Urdapilleta, I. (2004). Evaluation de fonctionnement cognitif du raisonnement humain et perspectives thérapeutiques. *Journal de thérapie comportementale et cognitive*, 14(2), 84-88.

Rosch, E. & Mervis, C. B. (1975). Family resemblances: Studies in the internal structure of categories. *Cognitive Psychology*, *5*, 573-605.

Rosch, E. (1973). Natural categories. Cognitive Psychology, 7, 328-350.

Ross, B. H. & Murphy, G. L. (1999). Food for thought: cross-classification and category organization in a complex real-world domain. *Cognitive Psychology*, *38*, 495-555.

Silver, E. A. (1981). Recall of mathematical problem information: solving related problems. *Journal for Research in Mathematics Education*, 12(1), 54-64.

Smith, E. E. & Medin, D. L. (1981). *Categories and concepts*, Cambridge MA: Harvard University Press.

Spelke, E. S., Breinlinger, K., Macomber, J. & Jacobson, K. (1992). Origins of knowledge. *Psychological Review*, *99*, 605-632.

Urdapilleta I., Mirabel-Sarron C., Meunier J.M. & Richard J.F., (2005). Etude du processus de catégorisation chez des patientes aux troubles des conduites alimentaires: une nouvelle approche cognitive de la psychopathologie. *L'encéphale*, 30(1), 82-91.

Urdapilleta, I., Mirabel-Sarron, C., Heron-Benaicha, G. & Richard, J. F. (2003). Approache cognitive des représentations d'aliments de jeunes femmes anorexiques. *Psychologie Française*, 48(4), 39-53.

Vosniadou, S. (1994). Capturing and modeling the process of conceptual change. *Learning and Instruction*, 4(1), 45-69.

Warington, E. K. (1975). The selective impairment of semantic memory. *Quarterly Journal of Experimental Psychology*, 27(4), 635-657.

Wattenmaker, W. D., Dewey, G. I., Murphy, T. D. & Medin, D. L. (1986). Linear separability and concept learning: Context, relational properties, and concept naturalness. *Cognitive Psychology*, 18, 158-194.

Wisniewski, E. J. & Medin, D. L. (1994). On the interaction of theory and data in concept learning. Cognitive Science, 18, 221-281.

NOTES

#Notes

- 1. ICD10/CIMD. (1997). Classification internationale des troubles mentaux et des troubles du comportement; critères diagnostiques pour la recherche. Paris: Masson.
- 2. The BMI (Body Mass Index) is calculated as follows: weight (in kilograms) divided by height² (in meters).
- 3. SPSS version 10.1.3. Copyright© SPSS Inc., 1989-2000.
- 4. Le Sphinx PSS Copyright© Sphinx Développement, 1986-1999.

ABSTRACTS

This study uses a categorization task to demonstrate representations and beliefs about different types of food by eating disorder subjects and a control group. Participants (*n*=173) were asked to classify 27 nouns designating foods in terms of similarities and differences, and then to verbally express the criteria used for their classification. We expected to find between-group differences in terms of properties used for classification. The results confirmed this hypothesis. Unlike the control group, the patients did not create categories based on socially shared knowledge; instead, they tended to create categories based on their relationship to the world and their pathology. We discuss the benefits of this task for demonstrating representations.

Nous présentons une expérimentation qui vise, en utilisant une tâche de catégorisation, à étudier les représentations d'aliments d'un groupe de jeunes filles souffrant de troubles de conduites alimentaires et d'un groupe témoin. Les participantes (n=173) effectuent une tâche de classification de 27 noms d'aliments en fonction de leurs similarités et différences puis expliquent les critères utilisés pour réaliser cette classification. Les résultats montrent que les propriétés utilisées par les différents groupes de participantes sont différentes. Contrairement au groupe témoin, les patientes souffrant de troubles des conduits alimentaires ne catégorisent pas en fonction de connaissances socialement partagées mais en fonction de leur relation au monde et de leur pathologie. Nous discutons des apports d'une tâche de catégorisation pour mettre en évidence des représentations.

INDEX

Keywords: Categorization, Eating disorders, Food representation, MDS model

AUTHORS

ISABEL URDAPILLETA

Laboratoire Cognition & Usages, Université de Paris 8 2 rue de la liberté 93526 Saint-Denis, France Isabel.urda@univ-paris8.fr

CHRISTINE MIRABEL-SARRON

Clinique des Maladies Mentales et de l'Encéphale, Hôpital Sainte Anne, Paris, France

RÉNATE EIBER

Clinique des Maladies Mentales et de l'Encéphale, Hôpital Sainte Anne, Paris, France

JEAN-FRANÇOIS RICHARD

Laboratoire Cognition & Usages, Université de Paris 8