Ideal Is Typical

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Abstract A well-established finding in research on concepts and categories is that some members are rated as better or more typical examples than others. It is generally thought that typicality reflects centrality, that is, that typical examples are those that are similar to many other members of the category. This interpretation of typicality is based on studies in which participants had little knowledge about the relevant categories. In the present study, experienced fishermen were asked to give goodness-of-example ratings to familiar freshwater fish. These fishermen were of two cultural groups with somewhat different goals and ideals. Typicality was well predicted by fishes' desirability and poorly predicted by their centrality. Further, the two cultural groups differed in their typicality ratings in ways that corresponded to their different goals and ideals. For knowledgeable reasoners typicality in natural taxonomic categories appears based on ideals rather than on centrality.

The psychology of concepts and categories has seen a great deal of progress over the past several decades (see Murphy, 2002 and Wisniewski, 2002 for recent reviews). Much of the impetus for a resurgence of interest in categorization came from studies by Rosch and her associates (e.g., Rosch & Mervis, 1975; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976) on the structure of natural object categories and by Brooks (1978; see also Jacoby & Brooks, 1984) on the roles of different kinds of processing (e.g., analytic versus nonanalytic) in category formation and representation. Although the field's overall progress has been undeniable, it has also been uneven, and sometimes researchers have been criticized for focusing so much on a single task that they end up learning more and more about less and less (e.g., Murphy, 2003). One antidote for insularity is to build bridges between lab and field research by studying populations of participants who have relevant knowledge and expertise in some content domain (e.g., Johnson & Mervis, 1998; Medin & Atran, 2004; Norman, Brooks, Coblentz, & Babcook, 1992; Norman et al., 1996). This can yield a two-way benefit, as measurement tools developed with the standard population of college undergraduates inform studies of other populations, and, in turn, studies of groups with relevant knowledge raise methodological and conceptual issues that feed back into new theory and data in the lab (e.g., Brooks, LeBlanc, & Norman, 2000).

The present research concerns one of the most basic empirical phenomena in categorization: typicality, or goodness of example. Not only is it the case that some instances of a category are rated as better examples than others, but also there is strong evidence that the underlying basis for typicality is centrality with respect to the category's features (Rosch & Mervis, 1975): It has often been found that good examples of a category tend to share features with other category members and to not share features with members of contrasting categories. For example, cardinals are often judged as better members of the category BIRD than are penguins, and feature-listing tasks with the same populations of participants show that cardinals have more category-typical properties (e.g., singing, flying, building nests in trees) than do penguins.

The notion that typicality is determined by centrality has a long history of empirical support, but it comes from studies that have certain limitations. First, studies of typicality have often used artificial categories (e.g., Medin & Schaffer, 1978). This allows experimental control of category structure but almost ensures that the stimuli will not be meaningful to participants (see Murphy & Allopenna, 1994, for an exception). Second, when studies have involved natural taxonomic categories (e.g., Rosch et al., 1976), the participants (undergraduates) generally have had little relevant knowledge about them.

To move beyond these limitations, one can either use more expert participants or use categories of a different sort. In either case the results seem to take a different form. Barsalou (1985) showed that typicality effects for goal-derived categories are driven by prox-

imity to ideals rather than centrality. For example, the best example of THINGS NOT TO EAT WHEN ON A DIET is not something with an average number of calories or something most resembling other foods in the category, but rather a food that has the maximum number of calories. Barsalou included natural taxonomic categories in his study and found that centrality was a reliable predictor of goodness-of-example ratings for these stimuli. Interestingly, however, he found that proximity to ideals (e.g., for birds, how much people enjoy them) was also a reliable predictor of goodness-of-example ratings for taxonomic categories.

Other studies have focused on natural taxonomic categories and participants with relevant knowledge and experience. These studies have found that typicality is better predicted by goals and ideals than by centrality. Lynch, Coley, and Medin (2000) asked landscapers, taxonomists, and parks-maintenance workers to judge the typicality of various local trees. Typicality ratings were driven less by trees' central tendency than by weediness and height. The best examples were the ones that had the fewest undesirable properties and the greatest characteristic adult height. Undergraduate ratings of the same trees were most highly correlated with word frequency.

Bailenson, Shum, Atran, Medin, and Coley (2002) collected goodness-of-example ratings using pictures of birds of Illinois and birds of Peten, Guatemala. The participants were U.S.A. bird experts, U.S.A. bird novices, and Itza' Maya farmers from Guatemala. Measures of centrality were derived from each group based on a hierarchical sorting task. Only novices showed an effect of centrality on typicality ratings. U.S.A. experts tended to give higher ratings to passerines (small songbirds) than to nonpasserines; Itza' Maya showed the opposite pattern.

The present study extends this prior work on expertise and typicality in several ways. First, the domain involved fishing expertise and freshwater fish. Second, we collected an independent measure of desirability. (One limitation of the Bailenson et al. (2002) study is that there was no independent measure of ideals. Similarly, Lynch et al. (2000) did not establish that height was an ideal, and height may have been correlated with other variables that influenced typicality.) Third, our participants were members of two different cultural groups who have been shown in previous work to have somewhat different ideals and goals with respect to fish (Medin, Ross, Atran, Burnett, & Blok, 2002; Medin et al., in press). If typicality judgments are based on ideals, then they should differ between these groups in predictable ways.

Experiment

Regular and avid fishermen in northern central Wisconsin were asked to give typicality ratings to a set of freshwater fish local to the area. They were also asked to sort these fish into class-inclusion hierarchies, from which we derive a measure of each fish's central tendency (see Medin et al., 2002, in press, for details). This allows a test of the hypothesis that central tendency determines typicality. We also consider centrality in the scientific taxonomy and four other possible predictors of a fish's typicality: desirability, familiarity to participants, size, and habitat.

Participants came from two different cultural groups: Native American Menominee Indians, whose home is in this part of Wisconsin, and a majority-culture (European-American) community in an adjacent county. Previous research has found that these groups regard certain fish as differently ideal, desirable, salient, or valuable (Medin et al., 2002, in press), and these differences give us some leverage for understanding the basis or bases of goodness-of-example judgments. These differences include the following:

(1) Sturgeon are considered to be sacred by the Menominee (Beck, 1995).
(2) Trout are relatively more salient and more valued by Menominee than by majority-culture fishermen.
(3) Majority-culture fishermen tend to focus relatively more on gamefish, or sportfish, than do Menominees.
(4) In an unconstrained sorting task, majority-culture fishermen are more likely to form groups of undesirable fish than are Menominees, and their category of undesirable fish is broader.
(5) Both groups have similar categories of a) "panfish" that make "good eating" and b) baitfish (minnows and shiners).
(6) Menominee fishermen are more likely to say that every fish has a role to play.

These generalizations are based on comparisons of the most expert fishermen in each group (Medin et al., in press), who constitute a subset of the present participants.

If typicality judgments are based on ideals, then the following predictions should hold:

(1) Overall, typicality should be well predicted by desirability and not by centrality.
(2) There should be a main effect of cultural group, with Menominee informants giving higher overall ratings.
(3) This main effect should be accompanied by a significant interaction of cultural group and fish group. Specifically, Menominee fishermen should give higher ratings to trout, sturgeon, rough fish, and baitfish, whereas majori-

ty-culture fishermen should give higher ratings to gamefish (unless there is a ceiling effect).

If goodness-of-example ratings conform to these predictions, this would constitute very strong evidence that typicality is driven by ideals among fish experts.

Method

Participants. The 66 participants were members of two communities – the Menominee reservation and a nearby county – in northern central Wisconsin, where fishing is common. They were nominated by others in their communities as either regular or avid fishermen. Unlike the usual undergraduate participants in studies of categorization and reasoning, these 66 participants had significant experience in the relevant domain (on average they had several decades of experience fishing). To get a rough measure of their knowledge, each participant was asked to say something ("anything that comes to mind") about each of the 44 fish used in this study (some of which are small and rarely seen) and to indicate whether he would be able to identify it by sight. By this measure, the average participant was familiar with 36 of the 44 fish (median = 37).

Procedure. Participants were interviewed individually and asked to complete three tasks, in this order: the familiarity task just described, a hierarchical sorting task, and a typicality rating task. The sorting task involved a set of cards printed with the names of 44 fish, selected to be broadly representative of the fish genera and families found in this part of Wisconsin. Cards corresponding to fish with which the participant was unfamiliar were removed from the deck. The participant was then asked to sort the remaining cards into as many piles as he wanted. He was instructed to sort the fish "as they go together by nature."

After this initial sorting, the participant was given an opportunity to split each of the initial groups into smaller groups. This procedure was repeated until the participant indicated that it would not make sense to split the groups further. The initial sorting was then restored, and participants were given an opportunity to join any combinations of these groups into larger groups. This procedure was repeated until the participant indicated that it would not make sense to combine the groups any further. At each stage, the participant was asked to explain the group(s) he had created. This procedure yielded, for each participant, a class-inclusion hierarchy of kinds of fish (see Medin et al., in press, for further details).

Next, the participant was asked to provide typicality ratings for all the fish. If a participant was unfamiliar with a fish, he did not give it a typicality rating. The instructions followed those of Rosch and Mervis (1975) verbatim. They introduce the idea that some examples are more representative of a category than others and that a good example is one that readily comes to mind when one thinks about the category. Printed on the rating form was the question, "How good an example of the category FISH?" Ratings were given on a 7-point scale with the following anchors: 1 = poor, 4 = fair, 7 = excellent.

Candidate predictors of typicality ratings. Six variables were evaluated as possible predictors of typicality: folk central tendency (folk CT), scientific central tendency (scientific CT), desirability, characteristic adult size, familiarity, and habitat.

Folk CT was derived from participants' hierarchical sortings of the fish. In each participant's sorting, each fish's distance from every other fish was measured as the number of levels one must ascend in the hierarchy to find a node under which the two fish are joined. If the two fish were at different levels in the hierarchy, then distance was measured as the number of levels ascended from the deeper fish.[1] From these distances, each fish's average distance to all other fish was computed. These average distances were then standardized for each participant, averaged across participants, and multiplied by -1 to yield an index of CT (a high number indicates that a fish is relatively close to many other fish in the average participant's sorting). *Scientific CT* is measured as a fish's average distance to the other 43 fish as they appear in the currently accepted evolutionary taxonomy, standardized and multiplied by -1.

Desirability was derived from justifications associated with the sorting task. Participants often formed categories of fish that they described as undesirable ("rough" or "garbage" fish) or desirable ("prestigious gamefish" and fish that are "good eating"). Each fish's desirability was computed as the proportion of times it was assigned to desirable groups minus the proportion of times it was assigned to undesirable groups. This was done for the cultural groups separately and combined.

Each fish's characteristic adult *size* was included as a possible predictor because it may be related to ideals and because it has been found relevant in related contexts (Hunn, 1999; Lynch et al., 2000). *Familiarity* was computed as the proportion of participants who knew a fish during the initial familiarity task. Finally, a fish's

[1] For example, suppose four fish *A*, *B*, *C*, and *D* form three nested groups like this: (((*AB*)*C*)*D*). Here the distance between *A* and *B* is 0; the distance between *A* and *C* is 1; and the distance between *A* and *D* is 2, as is the distance between *C* and *D*.

TABLE 1
Typicality Ratings and Predictor Variables

Fish	Typicality		Folk CT		Sci	Desirability			Size	
	Me	MC	Me	MC	CT	Me	MC	Fam	(cm)	Hab
American eel (lawyer)	2.4	1.6	-1.32	-0.89	-0.48	-.50	-.50	.64	152	1
Black sucker	4.1	3.1	-0.08	0.41	-0.23	-.17	-.58	.67	61	1
Black bullhead	3.7	4.1	-0.08	0.20	0.02	-.17	.17	.92	62	0
Black crappie	5.3	5.3	0.42	0.43	0.52	.43	.33	.92	49	-1
Blacktail chub	3.5	2.8	0.64	0.58	0.77	-.17	.00	.70	26	1
Bluegill	6.2	6.1	0.42	0.45	0.65	.43	.33	1.00	41	-1
Bluntnose minnow	4.0	2.6	0.86	0.14	0.77	-.17	.00	.50	11	1
Brook trout	6.8	6.3	-0.69	-0.88	-0.23	.14	.08	.98	70	1
Brown trout	6.8	5.9	-0.67	-0.87	-0.23	.14	.08	.97	103	1
Carp	2.8	3.2	-0.43	0.07	0.65	-.33	-.67	.94	122	0
Channel catfish	3.9	4.8	-0.43	-0.10	-0.10	.00	.08	.91	127	1
Dace	4.5	4.0	0.91	0.22	0.65	-.17	.00	.32	12	1
Darter	4.0	3.2	0.76	0.44	-0.10	-.17	.08	.30	10	1
Dogfish (bowfin)	2.3	1.9	-0.39	-0.15	-0.48	-1.00	-.83	.95	109	-1
Emerald shiner	3.5	3.5	0.69	0.71	0.90	-.17	.00	.59	13	1
Fathead minnow	4.0	3.2	0.61	0.27	0.77	-.17	.00	.88	10	0
Flathead catfish	4.5	4.8	-0.32	-0.18	-0.10	-.17	.00	.80	155	1
Gar (billfish)	2.5	1.9	-0.33	-0.33	-0.48	-1.00	-.83	.89	183	0
Golden shiner	3.9	3.8	0.52	0.25	0.65	-.17	.00	.94	30	0
Green sunfish	4.7	5.2	0.20	0.49	0.65	.57	.25	.85	31	-1
Lamprey eel	2.0	1.3	-1.34	-1.00	-5.73	-.67	-.42	.85	64	-1
Largemouth bass	6.7	5.9	0.31	0.21	0.52	.86	.50	1.00	97	-1
Mudminnow	3.7	2.9	0.91	0.23	-0.48	-.17	.00	.65	8	1
Musky	6.3	6.4	-0.26	-0.25	-0.23	.14	.67	1.00	183	0
Northern pike	6.0	6.5	0.09	-0.25	-0.23	.43	.67	.98	133	0
Pumpkinseed	5.3	5.8	0.42	0.49	0.65	.57	.33	.92	40	-1
Rainbow trout	6.9	5.9	-0.69	-0.84	-0.23	.14	.00	.92	114	1
Redhorse	3.6	2.5	-0.16	0.23	-0.23	-.17	-.58	.89	74	1
Redtail chub	3.7	3.3	0.56	0.54	0.77	-.17	.00	.71	23	1
River shiner	3.9	3.1	0.76	0.13	0.90	-.17	.00	.89	13	1
Rock bass	4.2	3.4	0.15	0.30	0.40	.40	.42	.98	43	0
Sauger	5.1	5.6	-0.16	-0.15	0.02	.14	.67	.67	76	0
Sheephead (drum)	2.7	2.4	-0.51	0.14	-0.48	-.33	-.67	.68	89	1
Smallmouth bass	6.1	5.9	0.24	0.22	0.52	.71	.50	1.00	69	0
Smelt	4.2	3.8	-0.42	-0.49	-0.48	.14	.00	.92	33	0
Spottail shiner	3.8	3.3	0.73	0.83	0.90	-.02	-.08	.61	15	1
Stickleback	3.4	1.9	0.30	0.19	-0.48	.00	.00	.38	7	1
Sturgeon	6.2	5.1	-0.75	-1.04	-0.48	.00	.08	1.00	274	1
Walleye	6.8	6.6	0.05	-0.02	0.02	.43	.75	1.00	91	0
White sucker	3.9	3.3	0.00	0.38	-0.23	-.17	-.50	.82	64	0
White bass	4.9	4.4	-0.22	0.33	-0.48	.57	.50	.88	45	1
White crappie	5.3	5.3	0.33	0.46	0.52	.29	.33	.91	53	-1
Yellow bullhead	3.7	4.0	-0.08	0.12	0.02	-.19	.25	.86	47	0
Yellow perch	6.0	6.1	0.12	0.05	-0.10	.43	.42	.97	40	-1

Note. CT = central tendency, Sci = scientific, Me = Menominee, MC = majority culture, Fam = familiarity, Hab = habitat.

habitat was coded as 1 if the fish is found mainly in rivers and streams, -1 if the fish is found mainly in lakes, and 0 if the fish is commonly found in both types of water.

Results

Typicality ratings and the values of the predictor variables are presented in Table 1. The first thing to note is that high ratings were given to desirable game-fish like musky, northern, walleye, and largemouth and smallmouth bass. High ratings were also given to other desirable fish like the bluegill, the walleye, and the yellow perch. Low ratings were given to rough fish like the gar and the dogfish. Minnows and other baitfish received intermediate ratings.

To get a broad perspective, typicality, folk CT, and desirability were computed over all 66 participants (rather than for each cultural group, as shown in Table

TABLE 2
Correlations Among Typicality and Predictor Variables

	Typicality	Folk CT	Sci CT	Desirability	Familiarity	Habitat	Size
Typicality		- .06	.28	.80**	.50**	- .24	.22
Folk CT			.64**	.24	- .38*	- .03	- .70**
Sci CT				.30*	- .05	.12	- .23
Desirability					.28	- .26	- .14
Familiarity						- .51**	.43**
Habitat							.02
Size							

Note. Because Menominee participants gave higher typicality ratings overall, ratings were standardized for each participant before being averaged and submitted to correlational analysis.
CT = central tendency, Sci = scientific.
*$p < .05$; **$p < .01$.

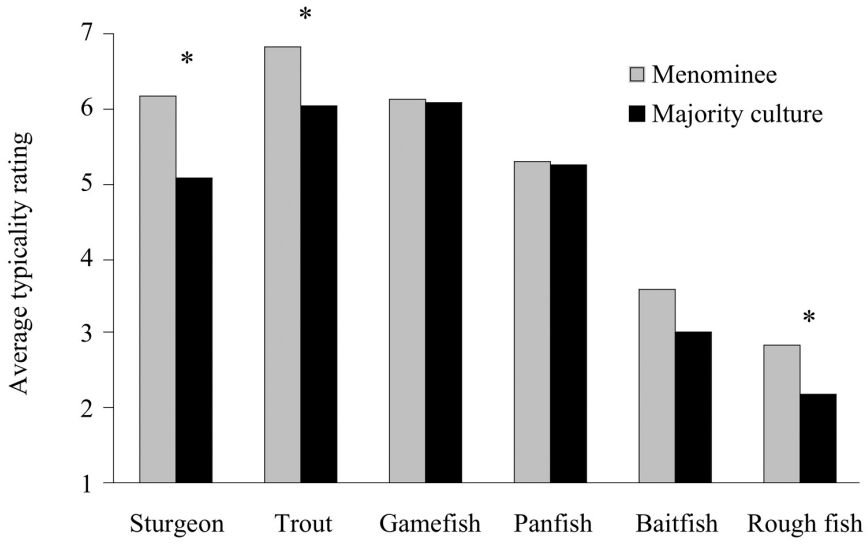

Figure 1. Average typicality ratings given to different types of fish by the two cultural groups.

1), and correlations among these and the other candidate predictors were computed. The correlations are shown in Table 2. Typicality is very highly related to desirability (r = .80) and fairly well related to familiarity (r = .50).[2] Both of these correlations are reliable (ps < .01), and no other predictor variable is reliably correlated with typicality.

Figure 1 collates much of the data in Table 1 into subcategories corresponding to the predictions we described in the introduction to this experiment. Gamefish comprise the musky, northern pike, sauger, largemouth bass, and smallmouth bass. Panfish comprise the black crappie, bluegill, green sunfish, pumpkinseed, rock bass, white crappie, and yellow perch. Rough fish comprise the American eel, black sucker, dogfish, gar, lamprey eel, redhorse, sheephead, and white sucker. Baitfish comprise the minnows, shiners, and chubs.

[2] The true correlation between typicality and desirability may be even higher. Desirability scores for the three trout were artificially low, because most participants who created overtly desirable and undesirable groups created a separate group for the trout, which, because it was an overtly taxonomic group, was not included in the computation of desirability scores. Informally, we know that both groups regard trout as desirable and that Menominee fishermen tend to regard them as somewhat more desirable than do majority-culture fishermen. When desirability scores for the three trout are set to .40, the correlation between (standardized) typicality and desirability goes up to .86.

As predicted, Menominee participants gave higher ratings overall, $F(1, 63) = 7.32$, $MSE = 3.5$, $p < .01$, and there was a significant interaction of cultural group and fish group, $F(5, 315) = 3.14$, $MSE = 0.88$, $p < .01$. This interaction took the form predicted in most respects. Menominee participants gave higher ratings than majority-culture participants to the trout (means 6.8 and 6.1, $t(63) = 4.33$, $p < .01$), the sturgeon (means 6.2 and 5.1, $t(64) = 3.06$, $p < .01$), and the rough fish (means 2.9 and 2.2, $t(64) = 2.23$, $p < .05$). The difference for baitfish fell short of reliability. There were essentially no group differences for gamefish and panfish. The lack of a difference for gamefish might reflect a ceiling effect or the fact that many majority-culture fishermen focus not on gamefish generally but on a single kind of gamefish (e.g., just smallmouth bass or just musky).

Discussion

The present findings constitute strong evidence that, for participants with significant experience of a category, typicality is driven more by ideals than by centrality. Desirability accounted for 64% of the variance in typicality ratings, and the pattern of cultural differences reinforces the hypothesis that ideals are the key factor in determining fishermen's typicality ratings. In this respect, our findings clarify and complement those of Lynch et al. (2000) and Bailenson et al. (2002). We go beyond these earlier studies by measuring ideals fairly directly (as desirability) and by drawing on known ideal-related differences between cultural groups. This has allowed a very precise test of the relationship between typicality and ideals.

It is worth noting that not only rated typicality but also centrality, as measured by naming and sorting tasks, may be influenced by ideals (see Berlin, 1992). If examples associated with ideals are a focus of attention, that focus may determine which features are encoded and the consequent knowledge about feature distributions that constitute psychological central tendencies. In the current study, the correlation between desirability and folk centrality was fairly low (.24), but unpublished work with the Itza' Maya has shown that ideals organize their SNAKE category so strongly as to drive performance on an unconstrained sorting task like the one used here. In short, central tendency is always relative to some set of features or properties, and that set may be influenced by ideals.

The traditional interpretation of typicality as centrality is part of a general and well-established approach to concepts and categories, in which the formation, representation, and use of concepts are understood to be determined largely by a domain's intrinsic structure (similarities and dissimilarities among its members, clusters of correlated features, and so on). The present study provides support for an alternative approach that allows for strong influences of more extrinsic factors like ideals, goals, and habits of mind – even in domains which, like biology, have rich intrinsic structure.

Part of the reason why the traditional approach has been so influential may be that empirical work has focused on undergraduates, who generally have little experience or knowledge of relevant categories (so little in some cases that word frequency is the best predictor of their judgments). Including more knowledgeable participants is an important step toward ecological validity. Still, even this may not reveal the whole picture. The present study and previous work suggest that folkbiological thought is sensitive to aspects of culture beyond mere exposure to and expertise in some domain. Research on folkbiological categorization and reasoning should expand to identify influences both of expertise and of cultural knowledge and culturally established habits of mind. More generally, we hope that cognitive psychology will build more and better bridges between the laboratory and the world – see Brooks et al. (2000) for a positive example – by studying participants with natural knowledge and experience in relevant domains.

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Sommaire

L'une des constatations empiriques fondamentales de la recherche sur les concepts et les catégories nous apprend que certains membres d'une catégorie donnée sont considérés comme de meilleurs exemples que d'autres, ou du moins des exemples plus typiques. En règle générale, on estime que la typicité témoigne de la centralité des traits caractéristiques d'une catégorie (Rosch et Mervis, 1975). Citons l'exemple des cardinaux, qui sont jugés plus représentatifs de la catégorie « oiseaux » que les manchots. Il se trouve que des tâches qui consistent à dénombrer les traits des deux révèlent que les cardinaux possèdent plus de traits caractéristiques de l'oiseau que n'en ont les manchots. Par contre, la preuve empirique de l'interprétation précitée de la typicité provient d'études dont les participants possédaient peu de connaissances ou d'expérience antérieures des catégories en question. Il a été découvert récemment que, dans le cas de participants bien informés, des facteurs autres que la centralité pourraient bien déterminer la typicité de catégories taxonomiques naturelles comme celles des oiseaux et des arbres (Bailenson et al., 2002; Lynch et al., 2000).

La présente étude met à l'épreuve l'hypothèse selon laquelle la typicité d'une catégorie taxonomique naturelle est susceptible de témoigner de la mesure dans laquelle le raisonneur juge idéal ou désirable un membre d'une catégorie donnée. Des pêcheurs expérimentés ont été invités à coter la qualité d'exemples de poissons d'eau douce. Chacun de son côté, ils se sont livrés à une tâche sans contrainte de triage des mêmes poissons en catégories hiérarchisées. Dans bien des cas, les hiérarchies regroupaient des catégories de poissons désirables et indésirables, sur lesquelles nous nous sommes fondés pour mesurer la désirabilité de chacun. Les résultats du triage ont également donné une mesure de la centralité de chaque poisson (un poisson fortement central se rapproche de nombreux autres poissons dans la hiérarchie du participant

moyen). Il a été constaté que la désirabilité était un fort prédicteur de la typicité. En outre, la familiarité d'un poisson avait une certaine valeur prédictive. Fait important, aucun rapport n'a été constaté entre la centralité et la typicité, et cela valait également pour la centralité dans la taxonomie scientifique, la taille caractéristique des adultes et l'habitat.

Fait à noter, les participants appartenaient à deux groupes culturels – des Amérindiens de la tribu des Monomini et une collectivité de culture majoritaire (américano-européenne) vivant à proximité – dont les buts et les idéaux divergeaient quelque peu. Selon les constatations, les cotes de typicité des deux groupes différaient de manières qui témoignaient de leurs buts et de leurs idéaux propres. Ainsi, les pêcheurs monomini tendaient à attribuer une valeur élevée à la truite et à lui allouer une cote de typicité élevée.

Les constatations décrites ci-dessus constituent la preuve concluante que les idéaux, plus que la centralité, déterminent la typicité chez les raisonneurs qui possèdent une expérience appréciable d'une catégorie donnée. De façon générale, nos recherches confortent une nouvelle perception des concepts et des catégories selon laquelle la formation, la représentation et l'utilisation de concepts ne sont pas autant déterminées par la structure intrinsèque d'un domaine (similitudes entre membres d'une catégorie, concentrations de traits en corrélation, et autres) que par des facteurs extrinsèques, notamment idéaux, buts et habitudes de l'esprit attribuables à la culture. Dans cette optique, nous souhaitons que la recherche en psychologie cognitive jette des ponts entre le laboratoire et le monde extérieur – voir Brooks et al. (2000), qui offre un exemple positif à cet égard – par l'étude de participants qui possèdent une connaissance et une expérience naturelles dans des domaines pertinents.