1

Design Between Enterprise And Market: Seeking A Way To Measure Semantic Discrimination And Attribution Processes.

Pietro Rutelli[1], Massimiliano Pastore[2]

1 Dipartimento di Psicologia, Università di Cagliari.
2 Dipartimento di Psicologia dello Sviluppo e della Socializzazione, Università di Padova.

Abstract. In the choice of a design object, tangible and intangible relations are established between its designers, manufacturers, distributors and consumers. A purchasing action is always more a place for the learning, simulation and representation of scripts, roles and screenplays of the self (Rutelli & Bortolanza, 2006). This work focuses on the feasibility of validating a protocol for use in defining the processes of discrimination and attribution between design objects, and the meanings that these objects represent. In particular, response frequencies and concentrations are measured to assess the discriminatory capacity of the items of an ad hoc protocol. The ARCLASS model (Lombardi & Sartori, 2006) can be applied to identify the classes that aggregate the object typologies and thus enable their prevalent semantic areas to be represented.

Keywords: Abstract relevance classes, ARCLASS model, Attribution processes, Design objects, Semantic discrimination.

Introduction

The general purpose of this contribution is to provide a statistical evaluation of a Model for interpreting Design Objects (MDO, Rutelli & Bortolanza, 2006) aimed at constructing a protocol for measuring the semantic discrimination and attribution processes a consumer uses in observing and perceiving specific categories of objects. Any industrial object is designed with a concept that floats between functionality/simplicity-of-use and sophisticated and meaningful structures possessing specific symbolic values. According to Appiano (1999, p. 78) *all (industrial objects) reflect an intention and each belongs to a code governing its functionality, utility, form and aesthetic value, or its uselessness and decorative or symbolic value...* Design objects thus possess a subjectivity between sensoriality and significance, they have a stylistic, communicative and symbolic content, they demand a design and semiological study, and they generally meet the standards of high quality. According to Dorfless (2001, pp. 11-12) design objects are characterized by an aesthetic quotient, even when they are produced serially following large-scale industrial logics. Objects represent genuine signification processes and their perceptive and sinaesthetic qualities (or so-called affordances: shape, color, matter, weight, ...) induce specific actions to be taken (Eco, 1968, 1997; Semprini, 1996; Violi, 1997; Volli, 2002). As a result, it has been proposed that objects can be seen as social agents, potentially interpretable within a narrative domain (Barthes, 1957, 1964, 1967; Lévi-Strauss, 1958; Baudrillard, 1968; Greimas, 1993; Floch, 1995). In addition, objects always tell us something about their owners, they can reveal the deepest aspects of human personality, and they constitute a virtual bridge between consumer and enterprise. In other words an object is not only a tool, but it is always related to symbols, language, communication, representation of meaning and significance (Rutelli & Bortolanza, 2006). The specific aim of this work is to outline the application of a survey protocol to measure the consumers' explicit and implicit expectations, related to the rational, emotional, functional, and symbolic meanings they attribute to specific categories of design objects. The use of such protocol may be particularly relevant to designers, manufacturers, interior decorators and distributors of design objects. On the one hand, one may think of a design object as being an object-symbol, both because individuals attribute it a specific value, and because the object itself contains highly subjective meanings expressed in these values, which translate the brand identity into a brand image. On the other hand, a design object can be viewed as an object-sign, possessing a value for a social group that is strictly related to the concept of brand identity, which, in turn, can be seen as a measure of the traits and properties that an enterprise deliberately attributes to its brand name. The survey protocol should enable consumers to represent their experience of categorizing functional and symbolic constructs, with rational and emotional attributions. In a constructivist perspective (Polkinghorne, 1988; Hollway, 1991), discrimination and attribution processes form an integral part of the premises for choice, selection, consumption, and fruition. In the present research context, it is also useful to refer to the contributions of symbolic interactionism (Blumer, 1969), because individuals design their purchasing actions in relation to the meaning that these actions have for them, and to the meaning that they generate in social interactions, which are constantly changing through a process of interpretation implemented by the individuals in relation to a given situation. Following this reasoning, researchers would benefit from using a multidimensional perspective in which subjectivity (the consumer's perceptions, categorizations and attributions) and objectivity (design objects and their structural qualities) are constantly interacting. Because the consumer knows the enterprise by its products, the enterprise, to reach its target, should not only gather as much information as possible regarding how the consumer considers its products. It should also care of getting information about the needs, desires, motives, identity, role, habits and lifestyles that characterize the domain of individuals, groups, segments and collectivities, so that it can ground its industrial design, production and distribution activities in a more efficient way. It is on these processes that the links of loyalty depend (Kapferer, 2000, p. 136). Consumers and enterprises constitute a shared universe, a brand equity, in the values that a brand tangibly or intangibly evokes and possesses. To establish the value of a brand (brand equity), we need to analyze it in its market setting, and consider how well is the brand known (brand awareness), how well is the brand accepted (brand acceptance), and to what degree it is preferred (brand preference). All these processes are then translated into loyalty (brand loyalty), i.e. a reiterated purchase of the products of a given brand and their use over time (Barni, 1998). The set of these characteristics of the brand are studied in brand marketing (products and values) and relational marketing (customers and desires), and they constitute our area of research. Enterprise, market and consumer are *co-protagonists in a repertoire of exchange whose dimensions characterize the evolution of the relationship between culture and economics in the transition between modernity and postmodernity* (Rutelli, 2004, p. 47). The history and evolution of objects as vectors of meaning and significance constantly floats between the demands of uniqueness and seriality of a product. As stated by Molotch (2003, p. 25) *economists ... define some types of objects as positional goods, meaning that people may want them, or not want them, due to the fact that other people have them: they do not want the product in question for its intrinsic value, but because possessing it places them in a better position with respect to other people. From my point of view, all consumer goods have a positional character...*

In the present contribution, we used a survey tool specifically based on the MDO, described by Rutelli and Bortolanza (2006). This model organizes the positioning of design objects into four semantic areas structured as quadrants defining the concepts of usage, elaboration, interaction and representation. The data obtained were analyzed using the ARCLASS model (Abstract Relevance Classes Modeling; Lombardi & Sartori, 2006) that enables the correspondence between the items in the tool (160) and the latent semantic relevance classes to be identified. ARCLASS is similar to data reduction models (i.e. Factor Analysis, Corrispondence Analysis) and has been implemented in the context of cognitive modeling of semantic memory processes (Sartori, Lombardi & Mattiuzzi, 2005). To summarize, the aims of this paper were: 1) to present the survey protocol based on MDO; 2) to briefly describe the ARCLASS model and to illustrate its application to empirical data in order to evaluate the latent structure of MDO.

Method

Participants

The tool was administered to a sample of 514 individuals who, by age, schooling and gender, are representative of the typical consumer of design objects (i.e. mainly young females with a fairly good academic education). Participants (193 males and 314 females, 7 NA's) was sampled in Cagliari district in different age classes (mean 32.74 years, sd 12.11, 1 NA), school levels (6 primary school, 87 middle school, 298 undergraduates, 115 graduates, 8 NA's) and occupations.

The tool

The survey protocol was constructed in relation to the four quadrants comprising the MDO (areas concerning usage, interaction, elaboration and representation). Each area assembles a homogeneous group of four object typologies (Rutelli & Bortolanza, 2006) defined as follows:

- Quadrant A: the rationality/functional utility area - concept of usage (objects for single use, for repeated use, technological and ergonomic objects)
- Quadrant B: the emotionality/functional utility area - concept of interaction (social, modular, spatial, disposable objects)
- Quadrant C: rationality/symbolic representation area - concept of elaboration (aesthetic-artistic, polymorphic, symbolic-metaphorical, instructional objects)
- Quadrant D: emotionality/symbolic representation area - concept of representation (anthropomorphic, zoomorphic-pantheiform, ludic-emotional, sensorimotor-perceptive objects).

For each object typology, we identified ten adjectivations or distinctive features that correspond to specific functional and symbolic, as well as rational and emotional ideal types, that the authors consider as constituting a universe of functions differentiated for each object and congruent for each area (see table 1.1). In our hypothesis these four areas would correspond to four latent classes.

Area for the rationality functional utility of the object	**Area for the emotionality functional utility of the object**
Concept of usage	*Concept of interaction*
single-use object/function (rational psyche)	social object/function (interactive, communicational and relational psyche)
multiple-use object/function (functional plurality psyche)	modular object/function (replicative psyche)
technological object/function (technology and innovation psyche)	spatial object/function (spatio-environmental psyche)
ergonomic object/function (structural-functional-adaptive psyche)	disposable object/function (temporal psyche)
Area for the rationality symbolic representation of the object	**Area for the emotionality symbolic representation of the object**
Concept of elaboration	*Concept of representation*
aesthetic-artistic object/function (aesthetic-formal psyche)	anthropomorphic object/function (corporeal psyche)
polymorphic object/function (proteiform psyche)	zoomorphic-pantheiform object/function (ecological-environmental psyche)
symbolic-metaphorical object/function (analogical-metaphorical psyche)	ludic-emotional object/function (emotional psyche)
instructional object/function (psyche of learning through use)	sensorimotor-perceptive object/function (psyche of the senses)

Table 1.1. Distribution of the functions of the design objects in relation to the four areas and related concepts established by MDO.

The protocol thus consisted of 160 items (10 for each of the 16 object typologies) that are repeated 16 times. The participants were tested individually. They were asked to observe 16 pictures, one at a time, each depicting a set of objects constitutive and distinctive of each typology. After observing the pictures (for as long as they wished), each observer marked the adjectivations or distinctive features in the 160-item protocol that, in their view, described the typical characteristics of the set of objects they had observed. No restriction was imposed on the number of items they marked. After the protocol for a given picture was completed, the next image was projected, and a new protocol was handled to the participant, until all pictures were displayed and evaluated. This method enabled the participants to choose the distinctive categorizations they considered most appropriate for defining all the 16 pictures.

The ARCLASS model

The aim of the ARCLASS model (Lombardi & Sartori, 2006) is to identify similarities between concepts. It was developed as an extension of Tversky's (1977) Ratio Model of Similarity and uses a non-negative matrix factorization (NMF) procedure (Lee & Seung, 1999) to estimate a few basic abstract relevance classes from a high-dimensional featural representation. The basic idea is to define a concept domain $\mathbf{D}$, described by a set of I different concepts (c_i) and J different features (f_i), respectively. In particular, $\mathbf{D}$ is represented by an $I \times J$ intensity matrix $\mathbf{X} = [x_{ij}]$, where $x_{ij} \in \mathbf{R}^+$ denotes the degree of association between Feature j and Concept i. In formal terms, the model involves breaking the matrix $\mathbf{X}$ down into two new matrices $\mathbf{Y}_{I\times M}$ and $\mathbf{Z}_{J\times M}$ so that the product $\mathbf{YZ}' = \mathbf{X}^*$ ($\mathbf{Z}'$ indicates the transpose of $\mathbf{Z}$) provides an approximation as close as possible to $\mathbf{X}$. M denotes the rank of the model, i.e. the number of abstract classes adopted in the model. $\mathbf{Y}$ includes M column vectors, called abstract concept relevance bundles, so $\mathbf{Y}$ is called the abstract concept matrix. $\mathbf{Z}$ includes M column vectors, called abstract feature relevance bundles, so $\mathbf{Z}$ is called the abstract feature matrix. The approximation of $\mathbf{X}$ is done such that, for a fixed rank M, the loss function

$$L_2(\mathbf{Y},\mathbf{Z}) = \left(\sum_{i=1}^{I} \sum_{j=1}^{J} (x_{ij} - x^*_{ij})^2 \right)^{1/2}$$

is minimized, subject to $y_{ij} \geq 0$ and $z_{jm} \geq 0$ for each i, j and m. The loss function represents the difference between the reproduced values and the observed values. Consequently, a smaller loss function value indicates a better fit. Loss function is commonly used for example in unidimensional scaling (see De Leeuw, 2005) or in Bayesian inference (see Robert, 2001). For more details about ARCLASS see Lombardi and Sartori (2006).

Results

The answers given by the 514 participants were first aggregated in a Descriptions (160) Objects (16) frequencies table where, for each of the 16 categories of objects, we can see how many times the descriptions were chosen in the 16 functional domains. In table 1.2, the items relating to the different domains have been aggregated with respect to the 16 functions in a matrix **H**. Thus, for example, the value of 1980 that we see in the cell on the first line of the first column indicates, for picture 1, the number of times that the observers selected the characteristics defined in the 10 items relating to the single-use function. The last column in the table indicates the mean frequency for each typology.

AREAS		P01	P02	P03	P04	P05	P06	P07	P08	P09	P10	P11	P12	P13	P14	P15	P16	MEAN
	single use	1980	1126	1195	852	1428	866	672	1542	484	749	932	665	521	312	686	431	902.56
	multiple use	625	1604	633	355	366	1242	436	423	174	507	244	561	125	97	212	240	490.25
	technological	388	1270	2349	776	185	683	984	145	418	518	275	736	322	315	334	278	623.50
USAGE	ergonomic	492	578	442	1196	239	302	229	91	197	745	207	122	591	131	161	185	369.25
	social	508	248	507	283	1491	189	324	336	141	152	321	493	145	242	153	176	356.81
	modular	335	328	217	137	191	1392	435	166	76	357	98	195	52	68	98	99	265.25
	spatial	333	379	345	283	307	1140	1754	105	352	346	72	94	156	431	96	285	404.88
INTERACT.	disposable	1241	763	696	478	715	593	344	2071	247	374	617	224	328	193	571	390	615.31
	aesthetic-artistic	676	926	803	1494	917	964	1302	394	2138	1027	856	419	1207	1544	1120	1286	1067.06
	polymorphic	245	614	246	688	246	1495	342	170	398	1510	258	261	348	422	298	859	525.00
	symbolic-metaphorical	187	320	268	404	290	270	155	200	585	398	1025	260	1231	888	847	481	488.06
ELABORAT.	instructional	88	55	185	75	49	190	44	127	94	98	217	1677	215	173	169	99	222.19
	anthropomorphic	52	80	59	431	51	27	30	35	214	163	378	88	1774	97	132	62	229.56
	zoomorphic-pantheiform	38	32	10	47	15	33	134	176	95	49	68	253	128	2120	520	555	267.06
	ludic-emotional	168	391	422	508	355	459	199	508	475	513	1040	993	1059	666	1363	697	613.50
REPRESENT.	sensorimotor-perceptive	261	485	562	1199	350	334	376	252	1109	325	411	360	536	753	451	1392	572.25

Table 1.2. Frequencies of the descriptions selected for each of the 16 object typologies in the 16 images presented. The last column shows the mean for each typology.

The results enable us to identify concentrations that account for how much the individuals link their perceptions of the 16 pictures to the items distinctive of the object typologies. The concentration of the frequencies on the main diagonal (the diagonal from the upper left to the lower right), calculated with $\frac{tr(\mathbf{H})}{\sum_i \sum_j h_{ij}}$, where $tr(\mathbf{H})$ is the trace of the matrix **H** (the trace of an n-by-n square matrix **A** is defined to be the sum of the elements on the main diagonal of **A**) and h_{ij} the frequencies of the single cells, amounts to 0.21. In 15 from 16 cases, the highest frequency is observed in the cell corresponding to the predicted typology. The only case in which this correspondence is lacking concerns the symbolic-metaphorical objects where, despite a marked predicted and reported frequency, the greater concentration of the choices made by the individuals coincides with adjectivations and categorizations typical of anthropomorphic objects. Moreover, the higher than average frequencies of the sample's choices is consistent with the view that the recognizability process takes place through an effect of entrainment or semantic integration even with adjectivations typical of other typologies. On the one hand, these data show the model's power in discriminating recognizability. On the other hand, they reveal an integration effect in the categorization processes, with a contribution from other "proximal" factors. This result seems to suggest the need of revising the survey protocol, using less descriptive, an more holistic items, in order to comply with the designers' categories on the one hand, and with the consumers' perception, attribution and categorization processes on the other.

The ARCLASS model was then applied to the Descriptions (160) × Objects (16) matrix. Given the nature of these data, ARCLASS provides a good framework for exploring the latent structure because unlike standard reduction models, such as factor analysis or principal component analysis, ARCLASS works with frequencies rather than correlation or covariance matrices.

The ARCLASS algorithm was ran varying M from 1 to 8 and computing loss function values (L_2^i, $i = 1, 2, ..., 8$) in order to evaluate the suboptimal decomposition. The selection criteria were the following: 1) the maximum of relative differences $(L_2^i - L_2^{i+1})/L_2^i$; 2) the minimum of loss function values L_2^i. These criteria enabled us to identify two solutions, for $M = 2$ ($(L_2^1 - L_2^2)/L_2^1 = .79$) and $M = 4$ ($L_2^4 = 5.56$) latent classes or factors, respectively. Each object was assigned to a class on the basis of the highest value it obtained in the abstract concept matrix $\mathbf{Y}$. Tables 1.3 and 1.4 show the distribution of the objects in the latent classes based on this criterion for the two solutions obtained. Figures 1.1 and 1.2 show the same distributions with reference to the semantic model assessed.

Rank	α_1	α_2
1	(0.927) zoomorphic-pantheiform	(1.127) technological
2	(0.836) anthropomorphic	(1.119) multiple-use
3	(0.704) aesthetic-artistic	(1.049) single-use
4	(0.645) sensorimotor-perceptive	(1.021) modular
5	(0.619) ludic-emotional	(0.855) disposable
6	(0.496) symbolic-metaphorical	(0.778) social
7		(0.684) spatial
8		(0.639) polymorphic
9		(0.597) ergonomic
10		(0.583) instructional

Table 1.3. Estimated values in the abstract concept matrix $\mathbf{Y}$ for the two-class solution.

Two-classes solution ($M = 2$).

The two-classes solution (table 1.3) indirectly confirms the internal consistency of the proposed model even as concerns the relevance of the four factors. Indeed, the functional utility domain in the α_2 class seems to be strongly represented by these object typologies, on both the rational and the emotional sides (technological, multiple-use, single-use, modular, disposable, social, spatial, polymorphic, ergonomic and instructional). Also, in the α_1 class, the symbolic representation domain seems in turn to be represented both on the rational and on the emotional sides by these specific object typologies (zoomorphic-pantheiform, anthropomorphic, aesthetic-artistic, sensorimotor-perceptive, ludic-emotional and symbolic-metaphorical). In order to capture the meaning and value of these findings, we can compare the objects belonging to the two classes with the paradigm established by Rutelli and Bortolanza (2006). The different object typologies defined by the classes show the discriminatory relevance of the classes themselves consistently with the predicted model:

- on the functional utility side, the position of the objects (in α_2 class) coincides with the predicted model in 8 out of 8 cases;
- on the symbolic representation side, the position of the objects (in α_1 class) coincides with the predicted model in 6 out of 8 cases.

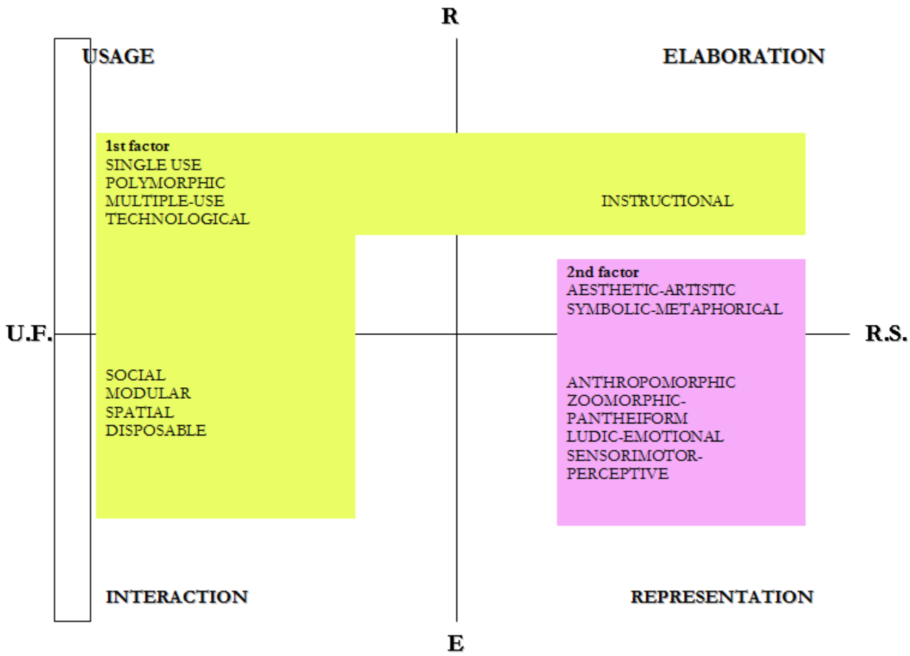

Fig. 1.1. Distribution of the aggregated objects in relation to the two-class solution congruent with the positioning of the objects predicted by MDO. R=rational, E= emotional, UF=functional utility, RS = symbolic representation.

Four-classes solution ($M = 4$).

The solution with four classes (table 1.4) enables a further test of the aggregations of the different object typologies, accounting both for the consistency of discriminatory positioning and for a holistic, combinatory and integrating effect of the different semantic areas. Here, the different object typologies defined by the classes show a different discriminatory relevance compared to those seen in the two-classes solution. Indeed, the four-classes solution demonstrates that the sample categorizes the object recognizability processes and their respective distinctive attributes by means of holistic processes, integrating and combining several semantic areas that are predicted by the model, but that are combined in a dynamic and modular sense into proximal semantic areas.

- The α_3 class aggregates the objects consistently with the rationality side, positioning the technological, multiple-use and instructional objects that demand predicted and predictable executive processes in the logical and rational plane.
- The α_4 class aggregates the objects consistently with the assembling and manipulating specificity of the objects, so this class includes the modular, spatial and polymorphic objects that demand a strong object construction and reconstruction process on the part of the consumer.
- The α_2 class aggregates the objects consistently with the functional utility side, pinpointing the single-use, disposable and social objects that have to do with predicted and predictable specific usage and interactive processes.
- The α_1 class appears to be the most complex and consequently the richest in meaning and significance. On the one hand, consistently with the peaks for symbolic representation and emotionality, it aggregates all the objects predicted by the model in the area of representation, i.e. zoomorphic-pantheiform, ludic-emotional, sensorimotor-perceptive and anthropomorphic objects; on the other hand, consistently with the rationality side, it aggregates the ergonomic, symbolic, metaphorical and aesthetic-artistic objects, consequently satisfying both the concepts of usage and elaboration.

Rank	α_1	α_2	α_3	α_4
1	(.504) zoomorphic-pantheiform	(.585) disposable	(.477) technological	(.377) modular
2	(.458) anthropomorphic	(.516) single-use	(.456) instructional	(.281) spatial
3	(.351) aesthetic-artistic	(.413) social	(.232) multiple-use	(.222) polymorphic
4	(.346) ludic-emotional			
5	(.324) sensorimotor-perceptive			
6	(.285) symbolic-metaphorical			
7	(.263) ergonomic			

Table 1.4. Estimated values in the abstract concept matrix **Y** for the four-class solution.

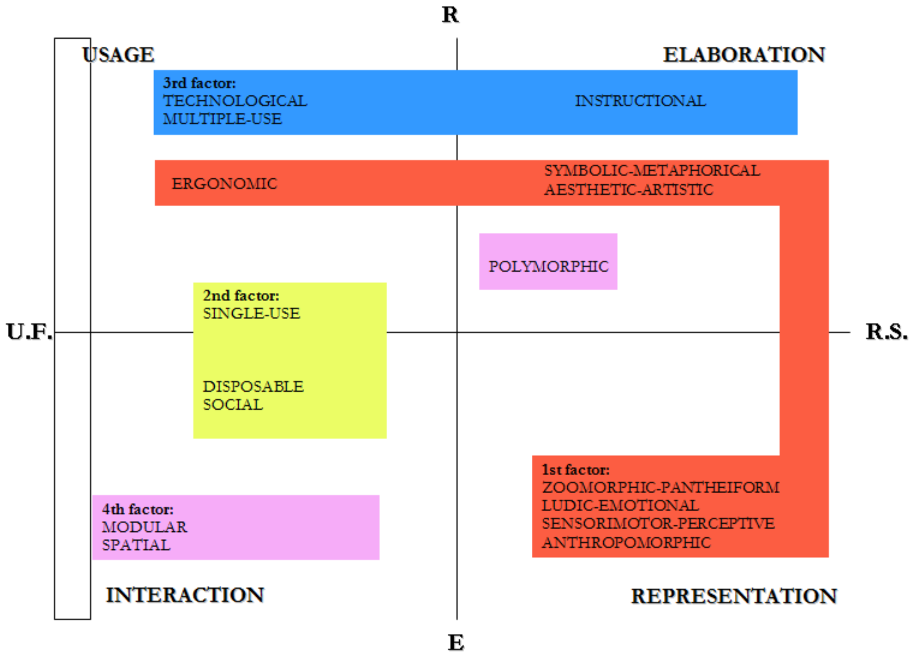

Fig. 1.2. Distribution of the aggregated objects in relation to the four-class solution congruent with the semantic positioning of the objects predicted by MDO. R=rational, E= emotional, UF=functional utility, RS = symbolic representation.

Conclusions

In this paper, the results of a survey protocol were presented aimed to evaluate MDO, a model for describing semantic discrimination and attribution processes in observing objects categories. The results were analyzed by means of ARCLASS, a model for computing similarities between concepts. MDO assumes four concept areas for classifying objects. Using ARCLASS, it was possible to investigate the correspondence between expected and reproduced MDO *latent* structure. Two cases, with two and four classes respectively, were considered. In particular, the interest was in evaluating the four classes solution in order to enable a direct comparison with the four areas defined by MDO. Importantly, in the observed contingency table **H** (see table 1.2), 21% of response frequencies fell on the main diagonal. This suggests that, consistently with the hypotheses, every picture (in columns) represented the specific characteristic (in rows) included in the survey protocol. In addition, the Four-classes solution had a lower loss function value with respect to all other rank decompositions ($M = 1, 2, ..., 8$). This means that the Four-classes solution showed the best fit. Our results confirmed a reasonable relationship between design objects and semantic constructs that characterize the discrimination and attribution process, even though estimated latent classes fit with expected areas are less than optimal. This work is a preliminary step towards an ergonomic validation of the paradigm that correlates technological with psychological aspects.

Consequently, as next step to be pursued in future studies, it seems worth calibrating the tool, reducing the items and making it more efficient to use. The results confirm the usefulness of the protocol for designers, interior decorators, furniture distributors and consumers. As Polkinghorne said (1992), human knowledge is not the mirror image of reality, nor of universal structures; it is a construction founded on cognitive processes (that, for the most part, take effect beyond awareness) and it incarnates the human being's interactions with the world of material objects, others and the self. The consumption of design, in its widest sense, is an extremely stimulating scenario that enables ludic simulations of possible identities. This process is well exemplified in the strategies for constructing a brand personality and brand community (Rutelli & Siri, 2005; Siri, 2005). Future studies will possibly further analyze the correlations between the areas of the model to identify the combinatory processes of semantic attribution and categorization, redeveloping them in a holistic, rather than a merely descriptive view.

References

Appiano, A. (1999). Pubblicità, comunicazione, immagine. Progetto e cultura visiva [Advertising, communication, image. Design and visual culture]. Bologna, Italy: Zanichelli.

Barni, S. (1998). La comunicazione d'impresa. Come prepararsi ad attuare una comunicazione di successo [The communication business. How to prepare to implement a statement of success]. Milano, Italy: Franco Angeli.

Barthes, R. (1957). Miti d'oggi [Mythologies]. Torino, Italy: Einaudi, 1994.

Barthes, R. (1964). Saggi critici [Critical Essays]. Torino, Italy: Einaudi, 2002.

Barthes, R. (1967). Criticità e verità [Criticism and Truth]. Torino, Italy: Einaudi, 2002.

Baudrillard, J. (1968). Il sistema degli oggetti [The System of Objects]. Milano, Italy: Compiano, 1972.

De Leeuw, J. (2005). Unidimensional Scaling. In Everitt & Howell Eds, Encyclopedia of Statistics in Behavioral Science. Chichester: Wiley.

Dorfles, G. (2001). Introduzione al disegno industriale [Introduction to Industrial Designs]. Torino, Italy: Einaudi.

Eco, U. (1968). La struttura assente [The absent structure]. Milano, Italy: Bompiani.

Eco, U. (1997). Semiotica e filosofia del linguaggio [Semiotics and philosophy of language]. Torino, Italy: Einaudi.

Floch, J. M. (1992). Semiotica, marketing e comunicazione: dietro i segni le strategie [Semiotics, Marketing and Communication, Beneath the Signs, the Strategies]. Milano, Italy: Franco Angeli, 2003.

Greimas, A. J. (1983). Del senso, II [Sense, II]. Milano, Italy: Bompiani, 1984.

Hollway, W. (1991). Objectivity and Subjectivity. The occupational psychologist. Special Issue on Qualitative Methods, 14, 10-13.

Kapferer, J. N. (2000). Re-inventare la marca: potranno le grandi marche sopravvivere al nuovo mercato? [Re-inventing the brand: can top brands survive the new market realities?] Milano, Italy: Franco Angeli, 2002.

Lee, D. & Seung, H. (1999). Learning the parts of objects by non-negative matrix factorization. Nature, 401, 788-791.

Lévi-Strauss, C. (1958). Antropologia strutturale [Structural Anthropology]. Milano, Italy: Il Saggiatore, 1966.

Lombardi L. & Sartori G. (2006). Concept similarity: an abstract relevance classes approach. Proceedings of the 7th International conference on cognitive modeling (pp. 190-195). Trieste, Italy: Edizioni Goliardiche.

Molotch, H. (2003). Fenomenologia del tostapane: come gli oggetti quotidiani diventano quello che sono [Where Stuff Comes From: How Toaster, Toilets, Cars, Computers, and Many Other Things Come to Be as They Are]. Milano, Italy: Raffaello Cortina, 2005.

Polkinghorne, D. E. (1988). Narrative Knowing and the Human Sciences. Albany, NY: State University of New York Press.

Polkinghorne, D. E. (1992). Postmodern epistemology of practice. In S. Kvale (Ed.), Psychology and Postmodernism. Thousand Oaks, CA: Sage.

Robert, C. P. (2001). The Bayesian Choice, Second Edition. NY: Springer.

Rutelli, P. (2004). Introduzione alla psicologia dei consumi. In P. Rutelli & M. Bustreo, L'impresa del se. Simboli e significati nella società postmoderna [The Self company. Symbols and meanings in postmodern society]. Milano, Italy: Franco Angeli.

Rutelli, P. & Bortolanza, E. (2006). Gli oggetti di qualità e i loro significati. [The objects of quality and their meanings] Milano, Italy: Raffaello Cortina Editore.

Rutelli, P. & Siri, G. (2005). Consumi e personalità [Consumption and personality]. In G. Siri (a cura di), Psicologia del consumatore- Consumi e costruzione del significato [Consumer Psychology - Consumption and construction of meaning] (pp. 99-128). Milano, Italy: McGraw Hill.

Rutelli, P. & Siri, G. (2005). Consumatore e brand personality [Consumer and brand personality]. In G. Siri (a cura di), Psicologia del consumatore- Consumi e costruzione del significato, [Consumer Psychology - Consumption and construction of meaning] (pp. 163-214). Milano, Italy: McGraw Hill.

Sartori, G., Lombardi, L. & Mattiuzzi, L. (2005). Semantic relevance best predicts normal and abnormal name retrieval. Neuropsychologia, 43, 754-770.

Semproni, A. (1996). La marca: dal prodotto al mercato, dal mercato alla società [The brand: from product to market, from the market to society]. Milano, Italy: Lupetti.

Siri, G. (2005) Le ricerche sul consumatore [Research on consumer]. Milano, Italy: McGraw Hill.

Tversky, A. (1977). Features of similarity. Psichological Review, 34, 327-352.

Violi, P. (1997). Significato ed esperienza [Meaning and experience]. Milano, Italy: Bompiani.

Volli, U. (2002). Manuale di semiotica [Manual semiotics]. Roma-Bari, Italy: Laterza,.