The Hierarchy of Needs and the Concept of Groups in Consumer Choice Theory [1943][1]

René Roy*

***Abstract*:** This is the first English translation of parts of an article published in the January 1943 issue of *Econometrica* by the French economist, René Roy. In it Roy sets out a theory of lexicographic preferences that anticipates more recent developments in the Post Keynesian theory of consumer behaviour.

[….]

A THE CONCEPT OF GROUPS CONSIDERED IN TERMS OF INCOME ALLOCATION

The general theories underlying pure economics recognise more or less explicitly that consumers are guided only by their tastes when required to choose between all goods offered to them; it is in the implementation of this principle that the economics of choice clearly seems to reside.

If consumers are completely free to choose in a liberal market system, this does not mean that in practical terms they exercise their freedom arbitrarily. The needs that various goods satisfy are not at all of the same degree of urgency because, in any given state of customs and social habits, consumers comply with a set of common necessities that apply to everyone, despite people's varying tastes. This observation is the source of the concept of groups for consumer goods.

These groups are conceived and could seemingly be established on the basis of the fact that, before consuming goods tied to the high end of the hierarchy of needs, all individuals first allocate their income to goods or services that are essential for survival in conditions imposed by their physical nature, the climate, the specific characteristics of their residence and social constraints. It is therefore possible to classify all goods and services in groups and to state that all consumers do not access a group of a given level until they have fully satisfied the needs that the groups at lower levels are meant to fulfil.

There is little doubt that in practice, if we examined the details of consumption habits associated with rising incomes in a sufficiently homogenous social stratum, we would find that consumers with the same income bought almost exactly the same kinds of goods. Even though a perfectly identical structure could not be established, it would still be possible to form groups on the basis of articles that take up, for each individual with a given income, an essentially fixed proportion of that income.

This constraint imposed on every member of a community constitutes only one among many statistical aspects of social phenomena. We can relate this constraint to the same causes of stable marriage or suicide rates, since these variables are obviously tied to certain trends in individual goals and expectations stemming from the necessities of life and society. As already noted by Cournot around the middle of the last century, this statistical aspect of social phenomena is bound to intensify as material living conditions become increasingly uniform.

In the final analysis, and with particular reference to consumer phenomena, we think that the concept of urgency in satisfying human needs tends to create a ranking scale of consumer goods such that they can be classified into groups, whereas the concept of taste is expressed within each group in terms of individual consumers' choice of articles meeting their personal preferences. Within groups, the availability of substitutes and complementary goods helps to determine consumer demand for specific articles.

Using this classification of consumer goods in groups characterised by urgency of need, we have established the general form of the relationship between the quantity index of a group and its price index – in other words the law of demand for the group studied – by applying a very debatable assumption: that the income proportion providing full satisfaction of the needs of a given group is independent of the total value of individual income.

To ensure that the hypothesis stays viable, we must examine the nature and expression of demand for a good satisfying a need of a specific degree of urgency. Take, for example, demand for housing. We obviously cannot claim that everyone spends the same proportion of their income on accommodation, but there is no doubt that demand for apartments with different options (living room, office, bathroom, central heating, etc.) is generally related to different standards of living. However, if we break down this good by each option, we can then isolate the demand corresponding to strictly essential housing, classified in the first group of consumer goods, and then build up from there, with each additional room characterising needs of a higher order and classified as such in higher groups. Therefore, when we isolate each element meeting increasingly high standards of living, the income proportion allocated to it varies very little with total income.

To clarify even more our concept of groups, we will examine it first in mainly abstract terms and then concretely, with some direct reference to statistical observations.

1°) Let us label *A*, *B*, *C*, etc. the various consumer goods up to number *n*; let us also suppose that there are *p* consumers.

For each of these consumers, there exists a hierarchy of needs and tastes so that the goods can be ranked in a specific order as the consumer's income grows from 0 to an infinitely large value. The resulting classification naturally varies from one consumer to another, so that if we consider commodity (merchandise) *M* in particular, the rankings m_1, m_2, …, m_i, …, m_p that various consumers respectively assign to it will make up a set that can be characterised by a dispersion scale based on the frequency of each number *i*.

Thus we can come up with *n* dispersion scales corresponding to *n* commodities *A*, *B*, *C*, …, *M*.

Some of these scales have common parts and may even seem identical; at the same time others have no commonality and are sometimes very distant from one another. The ones in the first category – and in particular those with many common features – characterise goods that belong to the same group; scales of the second category characterise goods corresponding to different degrees of urgency and therefore to different groups. Between the complete separation of two dispersion scales and their almost complete identity, there are of course a number of intermediate cases with partial overlapping, so we cannot make as clear a distinction as we would like. Yet it seems that a scale characterising a particular good can be related to a higher or lower group. In other words, we think that the

dispersion scales do not show a uniform distribution and that there are areas of accumulation reflecting the groups considered in our study.

In this framework, we have implicitly assumed that prices were given, because, theoretically, the order in which a consumer moves from one good to the next depends on relative prices. However, we do not believe that price variations affect the overall ranking of groups, for those price changes only induce substitution effects within each group, without modifying the classification or ranking position of a group. The notion of the hierarchy of needs, and hence that of commodities, is actually determined by physiological, moral or psychological motives, which, to a large extent, are indifferent to the variations in prices that can be observed in practice.

2°) If we really wanted to determine the composition of each group, we could proceed as follows:

Considering that individual incomes were increasing, we would identify, for a given population, the various consumer goods corresponding to each income bracket. This breakdown would show that each income increment would lead to the appearance of new consumer goods that were not associated, unless as exceptions, with the previous income brackets. It would thus be possible, in practical terms, to rank goods into groups, with the help of the values taken by individual revenues.

So it seems concretely and abstractly possible to flesh out the concept of groups in sufficient detail as an outcome of the hierarchy of needs.

[….]

C THE CONCEPT OF GROUPS AND THE TIES OF MUTUAL DEPENDENCE

In the economics of choice, the ties of mutual dependence between prices and quantities of various goods are considered in the abstract, without taking into account the hierarchy of needs, so that the demand for any given good depends on the prices of all other goods. Classical authors and their successors do consider some particular cases of demand independence, the substitution or the complementary nature of goods, but they do not relate these specific cases to general principles.

By contrast, if we consider the demand for groups of goods as summarised above, it is easy to see that some general distinctions can be established according to the relative rank order of the groups under study.

As a result of the hypothesis that was made regarding the allocation of income, any price change related to a group of rank *i* will have no impact on the demand for groups of a lower rank, whereas it will influence not only the demand for group *i* but also that for all groups of higher ranks. We can also flesh this out by saying that price variations for luxury objects will have no influence on the demand for necessities or products that are associated with a simple degree of comfort but are not in the luxury group. More precisely, we can add that the variation of prices for champagne will have no influence on the consumption of table wine, while instead a price variation for table wine could actually influence the demand for champagne.

We therefore develop the possibility of modifying the outlook of general relations of mutual dependence. By limiting ourselves to two goods, bread and wine for instance, and acknowledging that consumers can have all the free water they need, we can conclude the following:

1°) All consumers first allocate their income to bread, until they have satisfied their need for food, and for a homogenous group of consumers this satisfaction is obtained through a more or less constant consumption of bread for all consumers considered.

2°) Once the need for food has been satisfied, all consumers allocate what is left of their income to wine.

3°) The demand for bread is independent of the price of wine, but the demand for wine depends on the price of bread.

We can easily translate this simple case into a formula, at the very least for individual demand.

Let us denote by p_1, q_1, p_2, q_2 the prices and quantities demanded, respectively for each good 1 and 2.

Moreover l_1 is the quantity that enables consumers to satisfy their need for food.

Two cases are to be distinguished:

a) The consumer's income is less than $l_1 p_1$, which provides satiation for the first good.

In this case, designating the individual's income by y, we have that:

$$y < l_1 p_1 \begin{cases} \text{goods of rank } 1: \quad q_1 = \dfrac{y}{p_1}, \\ \text{goods of rank } 2: \quad q_2 = 0. \end{cases}$$

b) The income of the consumer is over $l_1 p_1$, which provides satiation for the first good.

$$y > l_1 p_1 \begin{cases} \text{goods of rank } 1: \quad q_1 = l_1, \\ \text{goods of rank } 2: q_2 = \dfrac{y - l_1 p_1}{p_2}. \end{cases}$$

The total demand for a group would be obtained by adding individual demands and would respond to the law of income distribution, as would be the case in more general presentations with an arbitrary number of goods.

We can therefore see that, in this heuristically simplified framework, the ties of mutual dependence are not as symmetrical as they are usually portrayed. Pareto was preoccupied with the order of consumption, but we do not think that he meant to tie this fact to the hierarchy of needs.

The transposition of the above ideas to the field of facts does not seem to contradict current observations; rather it seems to be confirmed by the use of standard categories of consumer goods: staples or necessary services, part-luxury, luxury and very luxurious products.

D ANSWERS TO A FEW OBJECTIONS

Apart from the objections made by Mr Marschak, we think it useful to examine those presented by Henry Schultz in his brilliant work on the theory and measure of demand.[2]

1°) The law of Pareto, on which we based our study, adjusts imperfectly to the observational data for lower incomes, which nevertheless have a significant influence on the demand for necessities and even on the demand for foodstuffs.

We completely agree with this, but it would be easy to substitute other more satisfying distribution laws for the simple law of Pareto, for example the law of Mr Gibrat based on the general principle called 'the Law of Proportional Effect'.

We add that using another distribution law will not modify the essential conclusions from the theory of groups.

2°) The existence of a saturation point that applies to everyone, regardless of income, is at the most only admissible for a few foodstuffs.

Also on this point, we completely agree with Schultz and we estimate that, to make no mistakes, our study will have to use Engel curves. But, even then, we think that the simple hypothesis we have come up with will not noticeably alter the conclusions essential to the study; we think it is useless to go back over the justifications that we developed in earlier pages regarding the hypothesis we have proposed.

3°) The preference scale on which a consumer classifies the various merchandise is a function of their price and cannot be used to explain prices.

The concept of groups is based specifically on the hypothesis that the degree of urgency of the various needs required by humans is tied to their physiological nature, their psychological state, their habits, or to the organisation of society, that is, to factors which are all independent of prices. Only within each group do relative prices, combined with individual tastes, have any effect on the demand for specific commodities, through the mechanism of substitution.

To return to the previously developed example, if there exist only two goods represented by bread and wine, while the consumption of water is free, the consumption order will not depend on the relative price of bread and wine, because the survival of the individual who needs to consume a given amount of bread would not depend on this relative price.

Also, in an infinitely more evolved society, all workers who live in the suburbs view their daily means of transportation as a necessity, which must be met regardless of price considerations.

Admittedly, we recognise that this concept of groups is difficult to clarify, and that for many commodities it may even be indeterminate, but we believe that rationally conducted statistical studies would enable us to reach a concrete and sufficiently well-defined classification.

4°) Verifying general formulae from the preceding theory requires gathering and processing elements regarding price, quantity and income. But once these documents are gathered, they could be used without the preceding hypothesis, which is still debatable. The empirically constructed demand curves could be inferred directly from Engel's curves, or from the consumption surface considered by Frisch (consumption, real price and real income).

We do not claim that our method is the only one able to infer demand curves from observational data. But our objective is not so much to establish these curves for specific commodities but to foresee their general form and show the factors they are dependent on. In other words, we think that it is always beneficial to relate the empirical determination of concrete elements to a theory that, as debatable and inexact as it is, constitutes the support of an interpretation and can also undergo changes to better suit reality.

Finally, we consider it essential to relate the consumption phenomenon, and therefore consumer demand, to the concept of the hierarchy of needs. Such is the ultimate foundation of this concept of groups that we strongly believe in. Without doubt, as Mr Marco Fanno observed, the demand for a group of commodities already constitutes an abstraction that removes from reality a portion of its concrete substance; but can we not ascertain, on the other hand, that this study of groups constitutes a first step that just cannot be skipped when proposing to conduct an analysis of demand phenomena.

We believe we have found confirmation of this viewpoint in the irregularity of the values observed for elasticity coefficients; it seems, at the present time at least, that the demand for an isolated article would be subject to too many changing factors to benefit from the determination of a somewhat stable coefficient. On the contrary, for a group of goods there exist infinitely more permanent features, enabling us to reach more regular forecasts and results.

Finally, regarding applications, the concept of groups is likely to be used directly. Common observation reveals the importance of problems such as the following:

The incidence of a variation in foodstuff prices or more generally in the prices of basic necessary goods over the consumption of goods meeting higher-level needs (books, trips, cars, etc.).

The influence of a decrease in incomes over the consumption of luxury articles or of goods of a relatively high rank.

Stating such problems implies that we are referring to groups of goods; but it is also evident that the solutions to these problems require an analysis of groups in conditions comparable to those that we introduced.

CONCLUSIONS

In a well-known letter addressed to Walras, Henri Poincaré observed what follows, regarding the limits assigned to the use of mathematics to present value theories:[3]

> When I spoke of 'just limits', this is not at all what I meant to say. I thought that at the beginning of any mathematical speculation there are hypotheses and that, to ensure that this speculation is fruitful, one must (as in other physical applications) realize what those hypotheses are. Only if we forget this condition do we go beyond just limits.
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> For example, in mechanics, we often neglect frictions and we look at bodies as being infinitely polished. You view men as being infinitely selfish and infinitely clairvoyant. The first hypothesis can be admitted in a first approximation, but the second needs perhaps a few qualifications.

Doesn't equilibrium analysis rely on such an implicit hypothesis when it claims that consumers choose indifferently between all goods, and shouldn't the use of indifference curves be subject to some restrictions?

For our part, we believe that such a representation, tacitly admitted in all economics of choice, constitutes an overly exaggerated abstract image of reality because it takes no account of the hierarchy of human needs that push the consumer to first acquire goods needed to survive or to satisfy physiological, moral and psychological motives.

It is to respond to this objection, and also to end up with proper forecasts of the nature of demand functions and of the values taken by elasticity coefficients, that we have divided consumer goods into groups meeting the hierarchy of needs.

While this theory is just a rough estimate, it nevertheless still reveals certain trends and proves certain results likely to be used in the practical field as well as in the general theory of demand.

Notes

1 Translated from 'La hiérarchie des besoins et la notion de groupes dans l'économie de choix', *Econometrica* 11(1), January 1943, pp. 11-24. Neither the introduction nor Section B (pp. 16-19) of the article have been translated, since they involved rather intricate points of detail, more specifically a controversy involving J. Marschak that dated back to 1931, which are not directly related to the main line of the story being told here. When the text was published, the managing editor made the following statement: 'This article was received from Professor Roy in 1940, but acceptance and publication have been unavoidably delayed and it has not been possible to send him proof or to let him see Professor Marschak's comment in the following paper'. That paper is 'Demand elasticities reviewed' (1943, pp. 25-34), and it deals essentially with the omitted section B and the 1931 run-in, which occurred at the first European meeting of the Econometric Society in Lausanne. At that meeting, Roy had presented the main results of a previous study, 'La demande dans ses rapports avec la répartition du revenu', *Metron* 8(3), pp. 101-53, which included the claim that the demand for a group of goods had to be inelastic, a claim to which Marschak objected when discussing the paper at the conference. When Roy refers to 'the objections of Mr. Marschak' in section D, he means the verbal objection made at the Lausanne conference. In his following comment, Marschak (1943, p. 25) recognises that Roy's earlier claim is correct, that is, the statement that 'the absolute value of the elasticity of demand for a "commodity group", if such a group is appropriately defined and assumed to exist, cannot exceed unity, does follow from his definitions and assumptions, as stated in Section C'. However Marschak is not convinced by the additional evidence provided by Roy in Section B, the mathematical part of the paper that has not been translated. He continues: 'On the other hand, the statement does not follow from Section B where a misleading remark the present writer made in 1931 is met by an unconvincing piece of reasoning by M. Roy'. This should help to explain why it was felt that Section B did not warrant a translation.

The translation was done by Sasha Green, a student of the School of Translation of the University of Ottawa, and it was revised by Marc Lavoie. We are grateful to The Econometric Society for allowing us to publish this translation.

2 [Editor's note: Here Roy mistakenly refers to *Henri* Schultz! The book in question is *The Theory and Measurement of Demand*, University of Chicago Press, Chicago, 1938, and Roy's method is dealt with on pages 120-8].

3 [Editor's note: The letter is indeed well-known, and can be found in William Jaffé (ed.), *Correspondence of Léon Walras and Related Papers, Volume 3*, 1965, Amsterdam: North-Holland, pp. 162-5. Jaffé provides the autographed version of the letter, dated 1901, as well as the published version, which was added as a postscript to what is considered to be the last scientific paper published by Walras, in 1909. That paper was reproduced, along with the letter, as 'Économique et mécanique', *Metroeconomica* 12(1), April 1960, pp. 1-13].