PERCEIVED HEALTH AND PURCHASE INTENTIONS OF FOOD PRODUCTS: A REVIEW ON CONSUMER BEHAVIOUR THEORIES FROM THE NUTRI-SCORE LABEL

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Abstract: There is an increasing need, for companies operating in the food sector, to sell their products by identifying the variables that maximize the willingness to buy of the consumers. However, it often happens that the variables that are taken into consideration in predictive models are declared variables or socio-demographic variables.

This paper aims to provide a literature review about the main Consumer Behaviour theories to understand their perceived health and purchase intention of food products. it offers an important review of the main studies in the field of behavioural theories and in the context of choice modelling, that is the sphere of the methodology that falls within the study of consumer choices. What happens very often is that behind the consumer's choices there are variables that are not easily understood or to be explained because they belong to a fraction of the perception of the subconscious of the human being that are not detectable and / or declarable through surveys through questionnaires or experimental auctions.
In the field of food there is not much research developed on this issue and therefore the aim of this work is to make a literature review on the main theories on the decision-making process, formulating a critique of the classic variables on consumer perception that do not they are always easy to detect and reflecting on the need to implement the development of methodologies based on the variables mentioned above, the so-called neuromarketing variables, in order to develop more accurate predictive models on consumer choices in the food sector.

Keywords: Consumer Behaviour Theories, TPB, Nutri-score label, Literature

INTRODUCTION

Economic development has caused profound changes in the way people eat, from a diet mainly based on products by a rural economy, there has been a shift to large-

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scale industrial production with products marketed through large-scale distribution, such as supermarkets and hypermarkets.

Over the years, this economic scenario has influenced consumer choices and contributed to defining a new consumer profile, the so-called 'post-modern consumer'. The latter, in fact, is constantly looking for the quality of food products where "quality" is intense as the set of attributes of a good or service that give it the ability to satisfy consumer preferences (Cicia, Cembalo, Del Giudice, & Verneau, 2012). Furthermore, consumers seek the satisfaction of basic needs and put quality on a par with the protection of fundamental needs, such as health and safety of people: these needs are legally protected by State legislation through (mandatory) Technical Regulations that prescribe the essential requirements for the protection of public interests, as well as, in many cases, the procedures for demonstrating compliance with these requirements.

The recent publication of the annual 'World Economic Forum' survey highlighted that the biggest concerns of 'millennials' are climate change, food and water security, health, safety, and well-being (World Economic Forum, 2017).

The consumer, therefore, is not only more demanding, more selective, more informed, more attentive to quality, but is also more sensitive to social and environmental issues. The consumer is therefore a subject in constant evolution because he is immersed in the great flow of change (Fabris, 2010).

THEORETICAL FRAMEWORK

Over the last few decades, health promotion literature has devoted a great deal of energy to studying the laws that regulate the change and learning of new behaviours, in relation to the undisputed impact on individual health of the behaviour itself and the context in which this behaviour is implemented.

There is substantial scientific evidence that the use of a clear and defined reference theory improves the effectiveness of a project or intervention (Nutbeam and Harris, 1999). It is important for health promotion practitioners to be familiar with the main models of behaviour modification, because although no theory is exhaustive on its own, it is necessary to be familiar with them to use them

critically and constructively in interventions in the field. What is often missing in health promotion practice are the specific skills and competences that each theoretical model implies and requires to be applied.

The main theorisations on how people decide to adopt a health behaviour (Health Behaviour Theory) are based on the study of the individual; clearly, when this individual interacts within a group, his decisions will be influenced and modified by the laws governing group behaviour (influence, peer pressure, etc.) and the mechanism will become increasingly complex as organisations with their rules and the community are considered. All these aspects must also be considered when planning health promotion interventions involving the individual, the groups and organisations to which he or she belongs and the community.

The study of the health behaviour of the individual is based on the following assumptions:

- in industrialised nations a substantial proportion of deaths are attributable to behavioural habits (smoking, diet, physical activity, sexual behaviour);
- behaviours are modifiable (Stroebe and Stroebe, 1997).

These basic assumptions have given rise to a myriad of research in the field of psychology and related disciplines with the aim of understanding and studying the elements underlying individual behaviour and, consequently, designing interventions that can produce improvements in the health of individuals and the population.

Among all the psychological theorisations on change, we will deal here with those belonging to the Anglo-Saxon and American psychology area and to the area of socio-cognitive psychology, because they are the most widespread and for which there are numerous efficacy studies; for this reason, therefore, all the other equally valid theorisations that refer to other theoretical orientations will not be taken into consideration here.

Theories that attempt to explain change focus mainly on the cognition-behaviour relationship (cognitive theories) and the context-behaviour relationship (environmental theories).

Cognitive theories assume that behaviour is volitional and voluntary, determined by a direct action of thought. Any change from an established 'norm' behaviour is analysed in relation to the adequacy of the underlying cognition and how well the cognition itself is adapted to the new experience. Primarily, cognitive theories have been used to investigate the roles of motivation, fears, and misperceptions.

Phased behavioural theories are based on the hypothesis of interaction between behaviour and cognition, so that different types of cognition operate at different levels.

Finally, environmental theories are based on the premise that it is the environment that influences behavioural choices, although they recognise that a person's reactions to a given environment are mediated by personal attitudes.

Quite different types of behaviour have been studied, but what they have in common is that they are behaviours that are, at least in part, subject to voluntary control and that they have a short- or long-term effect on the health of individuals.

Epidemiological studies have shown enormous variability among people in the type and pattern of health-protective behaviour (Peters et al., 2013). This individual variability is determined by a series of factors that affect behaviour in a direct way and can be briefly divided into internal factors and factors external to the individual. Internal factors include lifestyle (eating habits, smoking, alcohol use, physical activity, sexual behaviour), socio-environmental factors (gender, socio-economic status, ethnicity), individual vulnerability to stress and personality characteristics. Among the factors external to the individual, but with a strong influence on his or her individual behaviour, we find the social context to which the individual belongs with its rules and reference groups and their ability to provide social support, the physical environment in which the individual lives with the facilities and limits it imposes, the community with its norms.

In the field of internal factors, particular attention has been devoted to the study of beliefs, which are ideally considered a "bridge" between the individual's internal world and the external world, in virtue of their being individual but learned during the process of socialisation, during development, and in virtue of the fact that they tend to be stable over time and yet modifiable.

The present study stems from the historical events of the past years. From the 1970s to the present day, in fact, there have been a series of "food panic crises" in Italy (think of BSE or "mad cow disease", dioxin in mozzarella, "H1N1" avian influenza, the "Land of Fires") which, on the one hand, have been generated by the mass media and, on the other, by the lack of information for consumers (Adamowicz & Swait, 2012).

Food panic attacks' have been occurring more and more frequently in Italy in recent years, and this is due to the new consumer purchasing behaviours of postmodern society (Cicia, Cembalo, Del Giudice, & Verneau, 2012). However, there are some measures that can be taken and one of these methods is correct, clear, and complete information on food products that enables the consumer to choose independently.

The evolution of eating habits has therefore led to the emergence of a modern consumer who is attentive not only to convenience but also to the safety and quality of what he eats.

Among the research that have dealt with the link between trust, perception of risk and consumption choices, the Trust project survey has produced some interesting results (Ragona, Lobb, Traill, & Cavicchi, 2008). First, it highlighted some differences at the national level. Table 1 shows the risk perception for different types of meat and other foods in the five European countries surveyed by the project (Romano & Stefani, 2006).

The data in the table clearly show that in Italy there is more concern and a greater aversion to risk. Compared to the UK, Germany, the Netherlands, and France, for six of the eleven food groups considered (including the inappropriate categories of GMO and organic products), Italians therefore perceive a higher risk (Ragona & Mazzocchi, 2008).

Recent food labelling and health claims (introduced through the transposition of EU Regulation 1169/2011), food quality marks (EC Regulation 510/2006), such as DOC, IGP and STG, and BIO certifications (EC Regulation 834/2007) have enabled consumers to receive clearer and more transparent information with adequate knowledge of the territorial origin of food and to allow them to make informed choices.

The label must essentially achieve three objectives (European Commission, 2006):

- provide information on the nature, characteristics, and net quantity of the food, so that the consumer can compare the quality, quantity, and price of products to make informed choices.
- provide information on how to use the product and the period within which it should be consumed, to avoid inconvenience or damage because of improper use.
- provide information on the producer, to protect the consumer against possible fraud.

Table 1 - Food risk perception [20]

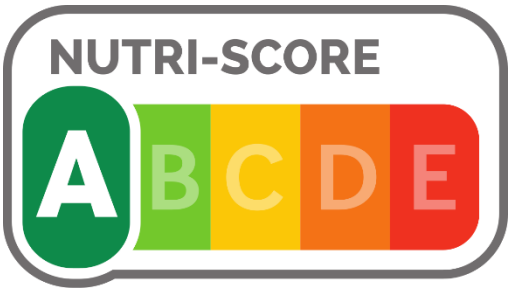
	Italy	UK	Germany	Netherlands	France	Total
	General risk aversion (1=min, 7=maximum risk)					
	5,35	4,81	3,98	4,26	4,86	4,69
	Food risk perception (1=max risk, 7=min risk)					
Lamb	5,01	5,33	5,16	5,03	5,43	5,20
Pork	4,78	4,97	4,85	4,63	4,80	4,80
Chicken	4,94	5,26	5,13	5,02	5,36	5,15
Beef	4,71	4,91	4,47	5,22	5,10	4,90
Prepared foods	3,63	4,40	4,30	4,14	4,17	4,12
Fish	5,08	5,32	5,14	5,36	5,26	5,24
Eggs	4,81	4,79	4,95	5,04	4,99	4,92
Dairy products	5,36	5,13	5,56	5,79	5,35	5,43
Fruits and vegetables	5,43	6,16	5,98	6,19	5,89	5,92
GMO foods	2,78	3,61	2,94	3,80	2,72	3,16
Organic foods	5,43	5,63	5,78	5,74	5,70	5,65

Source: our elaboration from (Ragona & Mazzocchi, 2008)

[20] General risk aversion was measured on a scale from lowest (=1) to highest (=7) risk aversion, so the country with the highest value is the most risk averse. Food risk perception, on the other hand, was reported on a scale from the highest (=1) to the lowest (=7) risk perception, so the country with the lowest value is the one that perceives a higher risk than the others.

A label that has been used in some European countries is the Nutri-score (NS). It is a summary, color-coded, graded Front-of-pack (FOP) label (Grunert & Wills, 2007) that shows a scale of five colours, from dark green to red. The NS combines positive characteristics (i.e., fruit, vegetables, and nuts, fiber, protein and rapeseed, walnut and olive oils content) with negative characteristics (i.e., energy, total sugar, saturated fatty acids, and sodium content) to achieve a score between - 15 (most healthy) and +40 (least healthy) (Julia & Hercberg, 2017a).

Figure 1 – Nutri-score label



As Figure 1 shows, this score is reduced to a combination of a letter (A to E) and a colour (from dark green to red), where A reflects the highest nutritional quality and E the lowest (Julia & Hercberg, 2017b). The central, yellow category C helps discourage dichotomous thinking (Julia & Hercberg, 2017a). The NS is not a substitute for the detailed nutrition box, which remains legally required by European Commission. Instead, it provides a way to simplify complex nutrition information (World Health Organization, 2017) and thereby guide or steer consumers toward healthier purchasing choices (Julia & Hercberg, 2017b), as well as incentivize manufacturers to improve the nutritional composition of their products (Santè Publique France, 2018; Vyth, Steenhuis, Roodenburg, Brug, & Seidell, 2010).

It has been officially recommended in several European countries (e.g., France, Belgium, Spain), reflecting their health authorities' belief that the NS can help them counteract the obesity epidemic (Flemish Institute for Healthy Living, 2018).

In response to these developments, researchers have begun to investigate perceptions and understanding of the NS. Many studies compare it with other FOP

nutrition labels, showing that the NS is the easiest to identify, requires the least time to understand across different product categories (Ducrot et al., 2015; Egnell, Talati, Hercberg, Pettigrew, & Julia, 2018), and is the most preferred label (Julia et al., 2017).

The five NS categories were defined deliberately to discourage dichotomous thinking (Julia & Hercberg, 2017a), yet it appears that consumers make little distinction between the healthiness of products with dark green and light green (A and B) labels or those with orange and red (D and E) labels. (Crosetto et al., 2018) argue that consumers behave as if there were only three categories. We test this claim among a sample of Flemish adults but also consider how a simplified view of perceived healthiness might relate to purchase intentions.

This study, therefore, stems from the fact that the consumer has transformed a so-called 'experience' good, assessed ex post, into a good subject to 'research', in the hope of inferring its quality and safety from information ex ante the purchase. This is a complex operation, which has enhanced the 'fiduciary' characteristics, i.e., those about which it is possible to obtain information not directly during the purchase or consumption of the product, but only indirectly through a series of information sources such as, for example, the mass media.

All this has also significantly affected market dynamics, not only in terms of consumption, but also and above all in terms of prices and product differentiation. In this minefield, what was once pure advertising communication is now subject to the rules of risk communication (Ragona & Mazzocchi, 2008). It is important to conduct a study on consumer purchasing behaviour as it is precisely around demand that the market adapts its supply, recalling here the concept of "retail market power" in which "downstream" market power is significant for the choices of producers who must base their supply on the demands of retailers and, in concert, consumers (Karantininis, 2017).

Accordingly, this paper reviews the main consumer behaviour theories in literature, to provide an overview of the state of research on the topic and to outline a future research agenda.

These results highlight the partial comprehension of the phenomenon observed and are a useful baseline for implications in terms of policies that could support the

evolution and achieving better quality of health at global level. Finally, a critical appraisal is framed for sketching out the policy maker role for better consumer purchasing behaviour achievement, with reference to the food labelling and the food law. The results and implications of this study inform practitioners and academics about the main existing studies on this topic, providing some insights about future research needs.

The remainder of the paper is structured as follows: after the introduction and the theoretical framework, in Section 2 the methodology is detailed. Section 3 introduces and explains the main consumer behaviour theories. Discussions and conclusions are detailed in the final sections.

METHODOLOGY

To achieve the aims of this study a literature review is performed. A review is considered an appropriate approach able to contribute in identifying research trends and future potentialities (Petticrew & Roberts, 2006; Tranfield et al., 2003). More recently, literature reviews has reached significant progress going beyond simply summarizing and deducing prior research, due to the wide availability of academic papers.

To perform a systematic, transparent, and replicable study the literature review needs to follow some specific steps, such as the definition of research questions, main theoretical papers, and a critical appraisal as well as the type of analysis to perform.

First, it is necessary to establish the research questions of the study related to how the literature has developed, what is the focus and what are the implications. In this study the research questions formulated are as follows:

RQ1. How is the *Consumer Behaviour Theories* literature developing according to an analysis of perceived health and purchase intentions of food products?

RQ2. What is the focus of the literature in *the theory of planned behaviour*?

RQ3. What are the Consumer behaviour theories applied to perceived health and purchase intentions of food products?

The variables that are generally considered concern the emotional content of the consumer: from the impact of labelling and health claims to food certifications, brand identity, nutritional values, studying the willingness to buy (WTB) for certain food products sold both in physical shops and online (Grunert & Ramus, 2005).

As this is a study of consumer psychology, this paper will use the Theory of Planned Behaviour (TPB) as a theoretical model of reference. This model explains human behaviour as the consequence of an intention, which in turn is the result of the interaction between various beliefs, i.e., the attitude, the subjective norms of the acting individual and the perception of control (Ajzen, 1991). At the end, these theoretical models will be compared with other behavioural models to understand the positive and negative aspects of each model.

RESULTS AND DISCUSSION

Models that analyse and describe how individual cognitive characteristics interpret and make sense of social situations, thus influencing behaviour, are called Social Cognition Models. Their basic assumption is that an individual's behaviour is best understood in terms of the individual's perception of the environmental/social context, i.e., in terms of how individuals perceive and make sense of the social context of reference.

The focus on cognitive aspects is determined by two considerations:

- what we think determines our behaviour and individual beliefs have the power to mediate the influence of other determinants (e.g., social class)
- thoughts and beliefs are, among individual factors, the most easily modified (compared, for example, to personality traits or emotional style).

The first conceptualisation of the relationship between different health beliefs and between health beliefs and behaviour is by (Lewin, 1951) and is expressed in terms of valence, i.e., value/attractiveness. According to this model the individual will tend to adopt a healthy style of behaviour to the extent that his or her health is an important/attractive value for him or her.

The social cognition models integrate this conceptualisation with the value-expectancy theory (Peak 1955) and the subjective expected utility theory (SEU, Edwards 1954). These theories postulate that individuals tend to maximise subjective utility and therefore prefer to adopt behaviours associated with high utility expectations. Clearly each behaviour will have a different 'subjective expected utility', depending on the different value placed on the outcomes and the probability of the outcome of the behaviour (subjective probability and utility assessment). "How useful is this new behaviour for improving my health and what is the probability that I will be able to carry out the required change?" "Will quitting smoking help me to stay healthy and is quitting smoking a behaviour that I am able to carry out successfully?" According to this theory, the behaviour is thus the result of a rational evaluation by the subject of the costs and benefits of the behaviour.

Such theories place the emphasis on individual rather than social behaviour; thus, they can help us predict which behaviours are selected by an individual (the most useful and the most likely), but they do not provide an adequate explanation of how individuals make decisions.

The step forward that social cognition models have tried to make with respect to previous models is the attempt to contextualise the understanding of individual behaviour, placing it within the social context of reference.

Specifically:

- Ajzen's Theory of Planned Behaviour (1985) and Bandura's Social Learning Theory (1977) describe how the individual makes his or her own decisions also in the light of the social context in which he or she is placed.
- The Health Belief Model of Becker (1974) and the Protection Motivation Theory of Maddux and Rogers (1983) describe the effect and functioning of messages that highlight the aspects of loss, cost, or danger of unhealthy behaviour.
- Diffusion Theory by Rogers (1983) illustrates how individuals in the social environment respond to health messages and in turn spread them.

None of these theories alone can be exhaustive, but they do indicate several "key variables" and processes that can help us to predict behaviour and choose the type of health promotion intervention.

Theories of Reasoned Action and Planned Behaviour (Ajzen e Fishbein, 1980, 1985)

Theory of Reasoned Action (Ajzen and Fishbein, 1980): this model identifies intention as a fundamental determinant of behaviour. Intention is the synthesis of two parallel cognitive processes: individual attitude (belief + value of belief itself) towards behaviour and relevant social norms. The central role is attributed to subjective norms (individual beliefs about the social world).

Intention is a function of: attitude towards a behaviour ("eating fruit and vegetables is unpleasant, it is important to me that meals are tasty"), subjective perception of social norms ("my friends say we should eat fruit and vegetables, it is important to me to do what my friends say"), confidence in the ability to exert control over the behaviour (similar to self-efficacy, "I trust my ability to eat fruit and vegetables if I want to").

An assumption of this theory is that the subject has resources, abilities, and opportunities to engage in the behaviour.

Theory of Planned Behaviour (Ajzen, 1985)

This model compared to the previous one includes an additional dimension: perceived control over the behaviour (internal factors: skills, information, and external factors: opportunities, dependence on others). Perceived control' can be summarised as a plan of action to pursue a behavioural goal.

This new formulation of the theory emphasises how the social influence on an individual determines the individual's decision to adopt a behaviour. This theory suggests that the proximal determinants of behaviour are subjective intention and perceived control over behaviour (a concept like Bandura's self-efficacy). Meta-analysis studies have indicated a predictivity of 66 to 71 % (Ajzen, 1991).

The analysis of the association between intention and behaviour gave conflicting results (e.g., about condom use there seems to be a significant correlation between intention and actual use in males but not in females, confirming the low power of women in sexual negotiations). In practice, an individual will adopt a behaviour if he or she believes that the behaviour will produce an outcome that is of value to him or her, if he or she believes that people relevant to him or her would like him or her to adopt it, and if he or she believes that he or she has the necessary resources and opportunities to adopt it.

Locus of Control Model (Rotter, 1966)

The concept stems from Rotter's (1954, 1966) social learning theory, according to which behaviour is a function of the reinforcement expectations attached to the behaviour and the value attributed to the reinforcement itself.
In the field of health, a person with Internal Locus of Control believes that his health is dependent on his preventive and health behaviours and therefore he will feel directly responsible, whereas the person with External Locus of Control believes that health depends on fate ("if something is going to happen, it will happen no matter what I do") or on significant others ("if I rely on a good doctor he will certainly save me") and therefore he will be less inclined to take active care of his health.

1. Wallston, Wallston and DeVellis (1978) developed the Multidimensional Health Locus of Control (MHLC) a more complex model, specific for health behaviour: it identifies internal control ("I am responsible for my state of health"), external control ("Whether I am well or ill depends on luck, on chance"), other power ("My health is completely in the hands of my doctor"). Individuals with internal control would be the most likely to adopt health-promoting behaviour.
2. Wallston and Smith (1994) emphasise the value of behaviour "individuals pursue goals that are meaningful, valuable to them" (in line with social learning theory). People who place a low value on health will tend not to engage in health-protective behaviour, irrespective of their locus of control with respect to health.

In addition to the internal/external dimension, the locus of control can also vary on two further dimensions:

- stability/ instability: the person may believe that a certain condition will never change (stable), or that it is specific and ascribable only to certain moments (unstable);
- comprehensiveness/specificity: the problem perceived by the person may group together various areas of his or her health (comprehensive) or it may be restricted to only one aspect of the problem (specific).

The Locus of Control model has given rise to a great deal of research, although the correlation between locus of control and health behaviour has proved to be modest and even authors have drawn pessimistic conclusions about the theory's ability to predict health behaviour. The subsequent decline of the concept is explained by the difficulty in verifying its modifiability and in identifying how its modification can optimise disease management (on which health-related aspects it acts, and to what extent). The theoretical interest in the concept has not been followed by extensive clinical application.

Self-Efficacy Model (Bandura. 1977)

In 1977 Bandura introduced the concept of perceived self-efficacy in the context of behaviour modification theories. This concept has become central in all areas of psychology, from clinical to health psychology. According to Bandura's socio-cognitive theory, behavioural change is facilitated by a feeling of self-control. If people believe they can do something to solve a problem, they are more inclined to act and are more motivated to pursue the decision they have made.

Motivation and action depend on three types of expectations:

1. situation-outcome (thoughts about what will happen, e.g., in the case of susceptibility to a disease): operate as distal determinants and act on behaviour primarily through action-outcome expectations. They represent the belief that the world will change without our personal involvement. Risks are perceived but the person may feel vulnerable to them (e.g., defensive optimism).
2. action-result (beliefs that a behaviour will or will not produce a certain result). They act on behaviour through intention and a sense of self-efficacy.

3. perceived self-efficacy (belief that the behaviour is under our control). Has a direct impact on behaviour (confidence and optimistic thoughts about oneself have a direct effect on performance) and an indirect effect through its influence on intention (individuals tend to carry out behaviours which they perceive to be within their control).

To engage in a health behaviour, I must therefore 1) consider my level of risk ("I could develop lung cancer"), 2) believe that behavioural change will reduce the risk ("if I stop smoking my risk of developing lung cancer will be reduced considerably") and 3) believe that I am able to change the behaviour (optimistic thoughts about self). The central aspects of this theorisation are knowledge (about the health risks and benefits of a certain behaviour), perceived self-efficacy, outcome expectations (cost-benefit analysis - physical, social and in terms of self-assessment - of adopting a behaviour), personal goals and planned strategies for achieving them and perceived facilitating/obstacle environmental aspects.

Self-efficacy is a fundamental determinant as it influences behaviour directly and mediated through its effect on other determinants of health: it influences an individual's goals and aspirations, the way he or she considers obstacles and hindrances, and finally it influences outcome expectations.

A great deal of research has been based on this model (control of risky sexual behaviour, exercise, weight control and eating habits, addictions), sometimes with very satisfactory results (Schwarzer, 1992) showing that self-efficacy, outcome expectations and intention are the main predictors of health behaviour.

However, self-efficacy is behaviour-specific: demonstrating a high degree of self-efficacy in performing a health-protective behaviour (e.g., exercising regularly) does not guarantee that one will pursue a different behaviour (e.g., quitting smoking) with the same degree of self-efficacy, whereas a high level of self-efficacy relating to a specific health behaviour correlates significantly with the performance of the behaviour itself (Yarcheski, Mahon, Yarcheski, & Cannella,2004).

The concept of self-efficacy has greatly influenced psychological theorising, as we shall see in the following paragraphs. Becker and Rosenstock attempted to include it in the Health Belief Model, mainly by reinterpreting their original concept of "drives/barriers to action". Ajzen modified the theory of reasoned action into a theory of planned action by including perceived behavioural control as a predictor,

like the concept of self-efficacy. Maddux and Rogers introduced Self Efficacy as a major determinant of intention in their Protection Motivation Theory.

Health Belief Model (HBM, Rosenstock e Becker, 1974)

Proposed by Rosenstock (1966) and modified by Becker (1974). More than an actual model it is an association of variables that influence behaviour, the precise way in which these variables work has never been specified.

This model is based on the perception of a disease perceived as 'threatening' to the subject and the consequent preventive behaviour. The probability of adopting a health-relevant behaviour is influenced by two evaluation processes:

- assessment of perceived susceptibility (personal risk of disease "my chances of getting breast cancer are high") and assessment of perceived severity, i.e., how dangerous a disease is in terms of pain, risk of death, social consequences ("the idea of breast cancer terrifies me")
- evaluation of the benefits ("if I practice self-examination every month, I could prevent future problems") and obstacles ("self-examination wastes my time and causes me anxiety") associated with preventive behaviour.

The least studied aspects of this model are the motivation to act and the impulses to act (e.g., doctor's warning, postal notices), perhaps because of the difficulty in giving them a unitary construct. This model assumes that the cognitive processes involved in decision-making take place simultaneously and in parallel.

In a meta-analysis by Harrison et al. (1992) its predictive capabilities4 were not encouraging: low correlation with behaviour and the various components of the model, taken individually, do not explain more than 4% of the variance of the behaviour adopted.

In general, the advantages of social cognition models applied to health can be summarised as follows

- they provide a clear framework for research (they guide the selection of variables to be considered, the procedure for obtaining valid and replicable measures and indicate how to order the different variables from each other to predict behaviour). Intention, self-efficacy, and outcome expectations play a key role in many models.

- with the identification of variables, such models improve our knowledge and understanding of health-related behaviour and thus can guide in the development of increasingly effective health promotion programmes;
- they provide a description of the cognitive processes that influence the individual's motivation towards different behaviours.
- they provide guidance for intervention: these models show that intervention is more effective if it is targeted at a specific behaviour (walking for 20 minutes, three times a week) than if it is targeted at categories of behaviour (doing physical activity) or goals (losing weight).

CONCLUSION

All these models have been applied to a variety of behaviours, but few studies have attempted to compare the predictive power of the various models.

Theories are not something static but must be able to evolve over time according to a cyclical process that presupposes the clarification of the reciprocal relationships between variables, the verification of these relationships, the specification or rejection of certain principles and the search for new relationships. A single study, however well done, allows only a limited verification of a theory. Finally, it may happen that a theory is effective in predicting a certain type of behaviour in one area but not in another, or a theory may explain a high percentage of variance but contain variables that are difficult to modify and thus be less useful from a practical point of view.

Already in the second half of the 1980s (Hill et al, 1985, Mullen et al 1987) Health Belief Model and Theory of Reasoned Action were compared, examining different behaviour: the outcome of these studies showed a "slightly" superior capacity of HBM in predicting behaviour. Remember, however, that HBM is an association of variables, rather than a causal model, and therefore does not provide practical guidance on change techniques. Conner and Norman (1995) compared Theory of Planned Behaviour and Health Belief Model with contrasting results.

Weinstein (1993) pointed out that out of 205 theoretically based articles published between 1974 and 1991, only 10 articles mention more than one theory and only four of these are empirical, practical comparisons. More recently, Noar and Zimmermann (2005) conducted a systematic search of the PsychInfo database up

to June 2003. The most frequently used theories are Health Belief Model, Theory of Reasoned Action/Theory of Planned Behaviour, Social Cognitive Model and Transtheoretical Model. Most of the articles consider only one theory, some are "predictive" articles that analyse some factors as determinants of the theories (e.g., self-efficacy) and evaluate the ability of these determinants to predict health behaviour. Only 13 articles published in journals or book chapters compare the theories with each other (0.4% out of 2901 total citations).

In 2002 in a Special Issue of the journal Health Education Research (Volume 17, issue 5 of Health Education Research) 15 health promotion programmes were presented and in each article the researchers described how and why the reference theories were chosen (Nigg et al., 2002). The first problem with these theories is that they regard the behaviour as individually chosen and determined (no consideration of the social context), stable (and not changing over time) but voluntarily modifiable. These theorisations therefore have an individual focus and refer to a cognitivist psychology. Moreover, the underlying metaphor of man as an information processor is clearly unconvincing.

A study by Ogden (2003) has also highlighted how Health Behaviour Theories are not falsifiable according to falsifiability standards and that when the data do not support certain aspects of the theory chosen as a reference the authors tend to offer a series of explanations without ever questioning the theory itself. Moreover, the fact that some theories of health behaviour do not specify in detail the type of relationship between the variables (e.g., Fisher and Fisher, 1992; Weinstein, 1993; Rimer, 1997) makes it even more difficult to test or falsify them. Thus, a proliferation of new theories attempting to explain health behaviour can be observed without any clarity as to the adequacy of existing theories. Moreover, most of the studies on the validity of models have focused on the study of the intentional phase and not on the actual action phase and thus on the actual implementation of the behaviour. There is in fact an incredibly low correlation (0.15, Norman & Conner, 2005); 0.17, Bish et al., 2000) between the intention to carry out a health screening and the actual carrying out of the screening.

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