



Ciencia Ergo Sum

ISSN: 1405-0269

ciencia.ergosum@yahoo.com.mx

Universidad Autónoma del Estado de México  
México

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Ciencia Ergo Sum, vol. 19, núm. 3, noviembre-febrero, 2012, pp. 225-238

Universidad Autónoma del Estado de México

Toluca, México

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# Oops! Many Marketing Models are Wrong

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Recepción: 23 de febrero de 2012

Aceptación: 28 de marzo de 2012

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## ¡Oops! Muchos modelos de “marketing” están contruidos con errores

**Resumen.** Muchos modelos de “marketing” que se encuentran en revistas científicas contienen errores de modelado. Este fenómeno ha sido observado desde hace más de treinta años, pero poco se ha hecho para corregir la situación. A fin de evitar señalar autores particulares, se discutirá un ejemplo que se encuentra en los periódicos. Formas apropiadas de los modelos son meticulosamente explicadas y se proporcionan ejemplos de enfoques adecuados de unos autores de “marketing”. El objetivo de este trabajo, no es despectivo sobre la literatura del “marketing, más bien es un esfuerzo por rectificar la forma en que la experimentación se hace y se explica.

**Palabras clave:** metodología de investigación, filtración de datos, depredación percibida, multidisciplinariedad.

**Abstract.** This paper deals with a touchy subject, that is, the fact that many marketing models found in scientific journals contain modeling errors. This phenomenon has been noted for over thirty years now but little has been done to correct the situation. In order to avoid pinpointing particular authors, this paper will discuss an example found in a newspaper. Proper ways of modeling are thoroughly explained and examples of adequate approaches from marketing authors are provided. The aim of this paper is not to be derogatory towards current marketing literature but rather to make an effort to rectify the way research is done and explained.

**Key words:** research methodology; data percolation; perceived predation, multidisciplinary.

## Introduction

While the marketing literature is rich and spread across various themes and fields (such as psychology), a close look at many models used in most marketing articles reveal that these are simply erroneous, incomplete or else unwittingly misleading. This is because proper precaution to understand concepts, variables, links between these variables and measurement methods falls short of scientific rigor. It seems that many articles are produced for the sake of production, without taking adequate care to examine data at hand. As an example, a recent article (whose author sometimes virulently criticizes other researchers) is itself plagued with shortcomings: upon taking a close look, one can notice that the list of fourteen attributes used in the article can actually be regrouped into core concepts that

are commonly used in marketing (e.g.: “annoying/disruptive”; trust: “trustworthy/reliable/informative”, etc.). In addition, the media that are examined in that research could have easily been regrouped as to whether they were transactional in nature (newspaper, radio, brochure, etc.), relational (letters, e-mails, telephone calls, etc.) or interpersonal (door-to-door). These three levels of interaction (transactional, relational, and interpersonal) are commonly discussed in marketing literature.

Anderson (1983: 28) noted insightfully: “What is required in marketing is a greater commitment to theory-driven programmatic research, aimed at solving cognitively and socially significant problems [...]”. This point of view on the lack of effort in quality analyses has since then been reiterated across different cultures (Olivier & Payette, 2010: 8).

Another serious shortcoming in marketing modeling is that of measurement. Many articles are guilty of poor measurement, even if in order “[...] to promote the development of theory and study in an area, good constructs and ways to measure them are needed” (Reid *et al.*, 2004: 243). Often, measurements are decided by authors without getting them to pass a reality test—yet, scales must be proven valid in the context where they have to be used (Plouffe, Hulland & Wachner, 2009: 422). Nunnally (1970: 133) had rightfully explained 40 years ago: “Strictly speaking, one validates not a measuring instrument but rather some use to which the instrument is put. For example, a test used to select college freshmen must be valid for that purpose, but it would not necessarily be valid for other purposes [...]”. To add to this, scales are often found to be dual in format, that is, the author uses two scales in one. For example, on a Likert scale, an author will use “unsatisfactory” on one hand and “fully satisfactory” on the other. Yet, dissatisfaction and satisfaction, to consider only this example, have been found to be two different constructs (Oliver, 1980), and should therefore not be used together. One author who himself has criticized the lack of ethical behaviour in research, has jointly used two different sets of measurement in his research on this topic: one cognitive (e.g.: “not at all; a lot”) and one “physical” (e.g.: “enormously”) which defeats any form of parallelism, an essential criteria for proper measurement.

Errors found in modeling have been discussed by authors such as Sawyer & Peter (1983) who found that a whopping 33% of article are biased towards the initial hypotheses, by Parameswaran & Yaprak (1987) who outlined the lack of rigor in psychometric measures in the field of consumer behaviour, and recently by Jarvis, MacKenzie & Podsakoff (2003), who presented the concept of formative and reflective variables.

To add to the above flaws, many models post so-called “floating constructs”: that is, constructs which role in the overall model is obscure or irrelevant, or else whose links to other constructs makes no coordinated sense. Constructs, to add value to a model, must start and end somewhere, and not be left hanging.

Most of these errors are related to quantitative research, yet any marketing researcher should have social skills that are necessary to interpret and test data in the market. Miles & Huberman indicate, in 2003, that the following skills are needed on the part of the researcher: a) he must be familiar with the context in which he is doing his investigation; b) he must be capable of sound modeling; c) he should privilege a multidisciplinary approach; and d), he must be

able to get the participants to talk and cooperate. It may not be too harsh to pretend that quite a few articles written in marketing journals seem to reflect the fact that the authors lack one or all of these necessary skills. Yet, some other authors have taken the steps to validate their findings, such as Ganesan, Malter and Rindfleish (“In an attempt to answer this question, we conducted follow-up interviews with a few of our respondents” (2005: 56).

Modeling should not be taken lightly; its goal is to improve on the sense given to a complex phenomenon and not the reverse (Brousselle *et al.*, 2009: 60). One does not want to create a complex model to reflect on a simple reality—regretfully, a common feast in the marketing literature.

This paper will use a model extracted from a newspaper article that reads as follows (Shaw, 2005):

Shoppers Drug Mart (SDM) charging key suppliers: Preferred vendors billed equivalent of 20% of business: Shoppers Drug Mart Corp. has taken the unprecedented step of charging key suppliers a fee for doing business with the retailer, a move that has some of the vendors crying foul. A surprise bill from Shoppers to its entire private label product suppliers went out last month, asking them to remit a “preferred vendor” charge equivalent to 20% of their business with the retailer in November and December. They said “either you pay it or you’re out [as a supplier]—there was no discussion”, said an industry source who referred to the missive as a “shakedown”. Another supplier who refused to pay the clawback had all of his products shipped back to him [...].

The above example presents two possible outcomes. Path 1: pay and you stay in business and path 2: do not pay and you’re out. Using marketing constructs commonly found in literature, it can be assumed that the suppliers experienced the sudden move by SDM as a breach of trust (if not of contract) leading to a questionable desire to cooperate, which created a negative atmosphere (“shakedown”). Hence, let’s assume that the surprise element affected trust, which then eventually influenced cooperation, which then resulted in a poor partnership atmosphere. If the surprise element is accepted and the new informal contract agreeable (pay the new fee), the working atmosphere will be maintained, although it may be tense or subject to questioning or lawsuits. If the surprise element is taken as a serious breach of trust, then the supplier will refuse to cooperate and there will be no more working atmosphere—the relationship will end. The exact nature of the bonds between these constructs will be discussed later in this paper on a hypothetical basis. Are the bonds causal, of influence, longitudinal? This remains to be seen.

This paper is divided as follows. First, we discuss what's "wrong" with most marketing approaches found in the marketing literature. We point in particular to research trends, honesty, accountability and obscurity. Second, we discuss how hypotheses (since about 98% of all research in marketing is of a hypothetico-deductive nature) and corresponding quantitative questionnaires should be formulated. Third, we present the notion of "observables". Fourth, we identify the types of links that can exist between constructs and the types of data that should be collected. Fifth, we proceed to build a single-construct model and present the concepts of structural and functional variables. We follow (sixth) by examining multiple construct models (the model deducted from the above SDM case). Seventh, we argue in favour of the technique of data percolation (Mesly, 2012). Finally, we conclude by pinpointing the fact that research must be grounded in reality and have a purpose. We also review how many articles end (and how they are often very short of divulging their real limits).

### 1. What's wrong with some generally-accepted marketing research approaches?

Upon reading articles after articles in marketing journals, one can notice that a number of flaws keep repeating themselves. Some concern in particular the general philosophy adopted by the authors, methods, data source, the ethics involved and lack of transparency and accountability. In short, a certain portion of the marketing literature seems to suffer from scientific myopia.

This phenomenon was noted by Gummesson (2002: 585), who wrote:

[...] marketing theory lags behind and (that) marketing as it is taught and researched today is a relic of the 1960s, patched up with decorations such as services, relationships and e-reductionistic. Academe is hiding behind an allegedly scientific front of deductive and reductionistic customer surveys, applying increasingly sophisticated statistical techniques that process data of decreasing quality. Generation of marketing theory requires more of inductive and systemic case study research allowing us to confront the complexity, ambiguity and dynamism of the real world with more common sense and less ritual.

Gummesson is not alone in criticizing our way of doing research in the marketing field. A French author (Aurifelle, 1999: 115) had mentioned that marketing researchers are

confronted to complex problems that are linked to consumer behaviours. Yet, according to him, little progress has been realized in terms of modeling and measurements. He points to the fact that too many variables are used, that they are inconsistent, do not reflect proper symmetry (parallelism), fall short in number and are not statistically processed in the correct manner. This paper will provide some ways of modeling that it hopes will help solve at least in part some of these on-going problems.

Many at times, marketing research is cornered in specific types of data, that is, for example, data is collected strictly through quantitative questionnaires (thus seriously limiting proper interpretation that could come from adding qualitative investigation). Data from the real world (e.g.: crime rates, company sales, retail shoplifting numbers, etc.) are simply, for the most part, disregarded, when in fact they could explain the context in which participants providing the data collected through quantitative questionnaires live and act. In too many occasions, an assumption of time is included in the researcher's analysis, when in fact the research is not at all longitudinal.

To make matters worse, some believe that authors will at times use reverse thinking: they will modify their data to fit their model, or else work backward from the data to create a model that is presented as if it were the actual starting point. Cossette (2007) refers to this as tampering.

In addition to using uselessly-complex models (plagues with floating constructs and measurement errors), authors will also endeavour to write text that is meant to be obscure. Yet, writing is done to be understood, not to impress people with smoke in mirror. The best test for a scientific article goes along the lines of what Glaser & Strauss (1967: 3) suggested: "[...] laymen involved in the area to which the theory applies will usually be able to understand it [...]".

Finally, there seems to be a lack of accountability when comes time to publish articles. First, for an author to vehemently and publicly criticize a colleague speaks volume as to how participants were probably treated (thus, ruining all credibility in the research). Second, model checks are often missing or else remorselessly partially done. A researcher is accountable for what he writes and should double, triple, quadruple verify his findings, rather than jumping to conclusions and making vague recommendations as to, for example, how managers could or should run their business (see Ryan & Bernard, 1994: 782).

The next section discusses in more details how a proper research should preferably be conducted, starting with hypothesis and questionnaire formulation.

## 2. Hypothesis and questionnaire formulation

A hypothesis is a proposition (Emory, 1985). It must propose events that are likely to occur, be plausible, relevant and measurable with observables, that is, it must be lead to a response (Guibert & Jumel, 1997). Technically, all hypotheses must be in the form of  $H_0$  and  $H_1$  (counter-hypothesis) to take into account type I and type II errors, which is very seldom done in marketing scientific papers.

Unfortunately, many hypotheses are overly complex, contain many sub-hypotheses, are not verified at the end of the article and lack clarity. A poor example that has been slightly modified to hide the author's name is as follows: " $H_2$ : Compared with younger clients, older clients are likely to remain attached for longer periods to the product they use". Questions that can be justifiably asked are (and that would probably occupy the respondent's mind): what is the definition of young, old, who does the comparison, are we referring to Bowlby's theory of attachment, what is a longer period of time, what product? This formulation, no matter how hard the marketing scientist would spend analysing the data, would never find a conclusive assessment.

Most articles also fail to note that hypotheses are checked within their context; hence, that context must be clarified. As an example, when testing for normality of population (normality of populations and residuals are alas! seldom verified in the marketing literature): "At the established significance level ( $p = 0.05$ ), there isn't enough evidence to refute  $H_0$  according to which residuals follow a normal law, as the Kolmogoroff-Smirnoff ( $K_S$ ) et Shapiro-Wilks ( $SW$ ) are greater than that level (with values at 0.200). The hypothesis is thus likely and residuals are considered to follow a normal law".

Questions formulated in questionnaires are no less obscure in many articles. Nunnally and Bernstein (1994) emphasize the fact that questions must be a) significant;

b) pertinent; c) measurable; d) objective; and e) use economy of language. We would add that they should f) be understood by the participant:<sup>1</sup> using concepts and wording that the participant is not familiar with will only lead to poor quality of responses; and g) stick to one idea at a time. Essentially, a questionnaire question must have a single subject, a single verb, a single complement, and occasionally an adverb. Doing more is most often causing confusion in the head of the participant. As an example of a poor question found in a questionnaire, we provide the following (slightly modified to conceal the authors' identity): "If necessary, we ought to be willing to change the way we live in order to cooperate with other countries in getting an equal standard for every person in the world. (Likert scale)". In this question, there are at least four others: a) what determines what is necessary? b) Why and how can we change our way of life? c) What other countries? d) Every person in the world?.

Another major flaw in marketing research is the use of additive questions. These are questions that essentially repeat themselves; they do not test the answer, they test whether the respondent is consistent with himself. This is a huge difference, and completely irrelevant for the purpose of testing the original hypothesis in most cases. An example taken from the literature is provided with slight modifications: "a) Watching TV ([...]or reading marketing articles) makes me feel good; b) Watching TV makes me very happy; c) I love watching TV; d) I am passionate watching TV; e) Watching TV is a pure delight".

The use of additive questions has gained widespread acceptance because researchers try to reach an acceptable Cronbach alpha, which is a mistake for some types of variables (see below). It has been proven that a well-planned questionnaire can reach proper Cronbach's alphas values without additive questions (Mesly, 2010). Furthermore, Podsakoff and Dalton (1987) warn that Cronbach's alpha is not a measure of the validity of construct, contrary to what some scientific authors seem to take for granted.

## 3. Observables

As mentioned in the above section, hypotheses must be measurable. To be measurable, they must rely on observables, that is, they must be expressions of behaviours that can be observed (e.g.: with your own eye, with an MRI, through the self-report statement of a participant).<sup>2</sup> As such, "intention to buy" is not an observable, and thus it is hard to believe in a construct defined as "intention to buy". Many real-life researches have a hard time reconciling intention

1. Coviello and Brodie (2001: 391) provide a proper procedure: "Following minor modifications to structure and wording, the instrument was pre-tested with a set of executive students similar to those ultimately targeted to participate in the research. The results suggested the instrument was understandable, interpreted appropriately, and captured the characteristics of marketing practice of interest in this investigation".
2. For many researches, self-reports are acceptable: "[...] even if it is true that people can fake most measures of self-report, this is no evidence at all that they actually do fake such instruments either in applied settings or in basic research in psychology [...] There is a great deal of positive evidence to show that many measures of self-report are reasonably valid" (Nunnally, 1970: 369).

to buy with the reality of consumers behaviours. Coke is an excellent example: before launching its new formula, Coke did many tests and consumers said they had a strong intention to buy. The new Coke was launched and it was a major flop: not only did Coke drinkers not buy, but they strongly condemned Coke for its initiative. Intention to buy would have to be measured (which is very hard) with such questions as: number of recent visits to the store or on a web-site; recent discussions with friends and knowledgeable people, etc. Of course, most of the time, these are hard to measure and not necessarily a good indication of the intention to buy anyway, so researchers satisfy themselves with empty concepts such as intention to buy. This can be accepted as long as the limits of the research are understood and mentioned in the article, which is seldom done.

The word “observable” is widely used in multicriteria analysis but has not made major inroads in marketing science. Yet, the basis of any research is an observable. Anderson & Gerbing (1988: 414) argue that “[...] at least four measures of a construct are needed for an assessment”. However, we disagree; we believe three separate, well-justified observables (turned into questions in the questionnaire) are sufficient and more functional. This is why: in a boxing match, there are always three judges, so that one can decide one way or the other (win or loss) in case of equality between the first two judges. The same applies to evaluating a concept. All observables are, by definition, a reflection of what is going on inside the participant’s mind; from this perspective, they are functional. They tell the researcher about how the participants think. Observables can be general (in general, happy people smile) or contextualized (in a car dealership, happy people enthusiastically shake the hand of the salesperson for example).

When preparing a questionnaire, the researcher must take great care in identifying the correct observables so that he chooses only those that are significant for his research. He may end up with a large number of them (for example, a happy customer smiles, talks positively to friends, makes more purchases, never complains, etc.). How to decide what to do with all the observables that seem to be relevant, when in fact only three are needed per construct?<sup>3</sup>

Four methods are available (yet, they appear to be rarely used –researchers seem to pick up observables and to formulate questions at random, as they

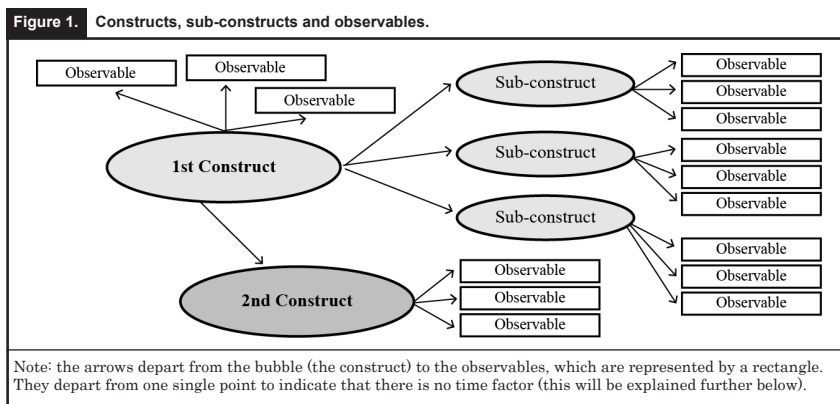
feel, without checking for consistency with their model). First, an exploratory investigation can be done to check which observables are best recognized by participants, and what terms they use (they would likely use the term win-win rather than the term equilibrium for instance). Second, one can find affinities between different observables (in the above example, there are affinities between annoying and disruptive). Third, the observables can be anchored in an existing model (for example, the observables could be linked to the AIO –activity, interest, opinions– model). Lastly, sub-constructs can be created. Nothing says, after all, that the construct the researcher is investigating is not in fact composed of sub-constructs that should ideally be measured individually.

Figure 1 illustrates a construct with three sub-constructs (and a second construct) and the way we propose that observables (these observables that will be turned into questions in the quantitative questionnaire) be represented:

There is more in terms of hypothesis and questionnaire formulation. The next section addresses links between constructs and types of data.

#### 4. Types of links between constructs and types of data

Most articles do not specify the types of links that exist between variables. As mentioned, they often assume a temporal link when in fact the study is not longitudinal, thus preventing to make such an assertion without strong literature support. Many articles assume a causal effect, when in fact causality is very hard to prove (Ackoff, 1957: 7; Brewer & Hunter, 1989: 42, 149; Brannen, 1992; Neuman, 1994: 43, 99; Cossette & Lapointe, 1997: 49; Miles & Huberman, 2003: 273; Buchanan & Bryman, 2007: 494).



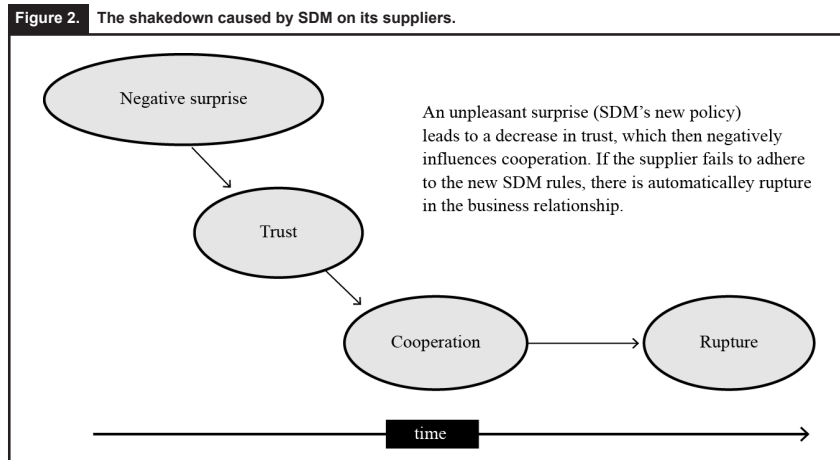
3. For each observable, the standard is to have nine participants, so that each single concept would be measured with a population sample of at least 27 participants (Mesly, 2011).

Overall, to determine the kind of link that exists between variables (constructs), one can rely on the kinds of analyses that can be performed with statistical packages. There are four elementary possibilities, which rank in order of complexity as follows: *a*) a descriptive (more to follow below) – e.g.: percentages, male-female population, some correlations, etc.; *b*) influence; *c*) predictive (longitudinal); and *d*) causal.

Hypotheses statements must necessarily be anchored in one of these four possibilities. Too many times, hypotheses are expressed at large and then tested but then, the statistical tests do not correspond to the actual hypothesis that was formulated. Navarro *et al.* (2010: 45) provide an example of a hypothesis that is formulated taking into account the kind of statistical test that will likely be performed: “EMO is positively related to export commitment”. Clearly, the two constructs are EMO and export commitment, and the link is correlational. There is a subject (“EMO”), a verb (“is related”) and a complement (“to export commitment”) and even the sign that the authors assume to characterize the link (“positively”).

It is thus of utmost importance that marketing researchers establish the kind of links that bond their variables, failing what they will most probably formulate erroneous hypotheses and run useless tests, thus leading to dubious conclusions.

To achieve better clarity, we strongly recommend that the links be stipulated in the model. We proceed with the example on SDM. Let’s assume that the surprise element influences trust, and that trust influences cooperation. Poor cooperation would cause a negative relational atmosphere just like heat under a pot will boil water (the causality cannot be disputed). Of course, this model would have to be tested, but in order to do so, it would have to be properly represented and hypothesized, as follows (see figure 2):



Note that we assume that the lack of cooperation has a causal effect on atmosphere: this is because it is very clear from the text that should suppliers not follow the new directive, they will be kicked out. This is equivalent to heat boiling water: put heat under a pot and water will boil. Heat causes the water to boil. Failure to cooperate will cause SDM to discontinue the supplier. There is no in-between or alternatives.

Another common problem found in marketing literature concerns the difference between mediating and moderating variables. Many authors pretend that certain variables are, for example, mediating, but fail to express them graphically the correct way, or else fail to test the mediation by using statistical tools. To that effect, Baron & Kenny’s (1986) method has proven excellent and is most frequently used (see annex A).

As for moderator variables, the trick is that most moderators are exterior to the situation being considered; they act as a factor. For example, a moderating variable in the SDM would be the heat in the office where the president of the supplier receiving the bad news from SDM would sit. Too much heat would add to his discomfort with the bad news.

At last, it is important that the researcher asks himself the following questions, failing what he will most likely perform the wrong statistical analyses or else perform incomplete analyses (which is frequently the case); *a*) are data nominal, ordinal, of ratio or continuous? *b*) How many variables (constructs) are in the model? *c*) Are data paired, metric or non-parametric? *d*) What exactly is to be measured (The existence of a link? The strength of that link? The nature of the link; the sign of the link –positive or negative? Frequencies? Differences? Sheer quantities?)

Any hypothesis should necessarily be formulated to respond to one of these questions. There are no other ways around it, unless the researcher wants to produce an article that has poor scientific value.

### 5. Single construct

Contrary to common belief (in marketing at least), a model does not have to be complex. In fact, a model can consist of only one construct (one bubble, whereby the bubble represents a construct, whether it is observed or latent; that is, resulting from sub-constructs that are observed without itself being the result of observations).

We strongly recommend to dividing bubbles in two different formats: structural and functional. As the reader will be able to judge, few marketing articles make appropriate distinction between structural and functional variables, which is a substantial mistake first because these are not subject to time (hence, one cannot infer a longitudinal effect) and second, because they imply absence or presence of co-linearity (which means different statistical tests would apply).

Structural variables are similar in concept to formative constructs as proposed by Jarvis, McKenzie & Podsakoff (2003). To best explain a structural variable, we take the example of a bicycle. A bicycle is formed of a number of structures: seat, chain, wheels, etc. Each structural component exists independently. When these components are put together, they form a structure called a bicycle. Take out one component or add one and you no longer have a bicycle. For example, take away one wheel and it turns into a unicycle, which requires a largely different set of skills to be able to ride it. Similarly, constructs are formed of structural variables (or sub-constructs). For example, it has been shown that trust in a business relationship is structurally formed of affinity, benevolence, ability and integrity (Mesly, 2010). Take away integrity (reduce it to zero) and there will simply be absolutely no trust. In the *SDM* example, trust is failing because the integrity of the relationship is put to test by the new measures put in place by *SDM*, by surprise. Structural variables are sine qua non conditions that define a construct.<sup>4</sup>

Very few articles have, in fact, taken the time to identify the structural variables pertaining to constructs being discussed. Hence, these constructs are somewhat diluted; this should necessarily be mentioned in the research limits.

Technically, there should be no correlation between the structural components, that is, there should be no co-linearity (see Collier & Bienstock, 2009: 284). This makes it an ideal scenario to run regression analyses (providing the main construct is also measured separately, which can be done by using observables). As such, it is a considerable error to long for high Cronbach's alphas between questions that pertain to different structural variables that form a single construct; yet, it is very commonly done in marketing research.<sup>5</sup>

The figure 3 exemplifies structural variables as they apply to the construct of trust.

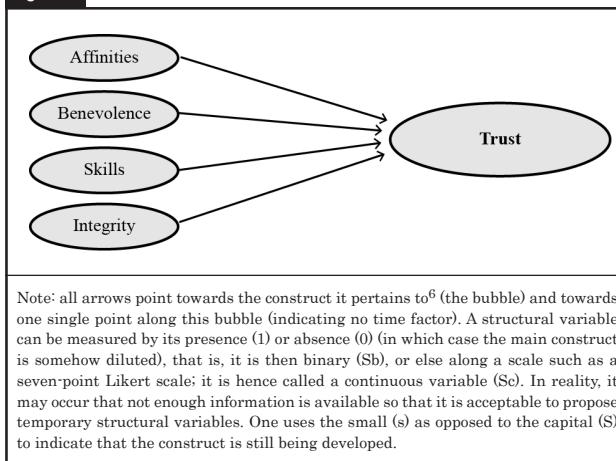
In the *SDM* case, the text does not provide enough information to qualify the four elements of trust (affinity, benevolence, ability and integrity) but one can guess that it is the integrity of *SDM*'s sudden decision that is questioned by its suppliers ("some of the vendors crying foul").

There is absolutely no time factor neither involved in structural variables nor is there in functional variable. To

explain what functional variables are, we resort once more to the example of the bicycle. If an observer were to be told to guess what product one is talking about when referring to the following characteristics, what would be his response? Tour de France, no gas, needs human energy, travels on ground, is relatively light, can reach normal speeds of say 30 kms/hour. The observer would probably be lead to think we are referring to a bicycle. These clues are functional variables. As another example, it has been shown that cooperation within business dyads is functionally represented by four variables or sub-constructs (Mesly, 201a) flexibility, exchange of information, joint problem resolution and (client or seller) orientation.

Functional variable are tied together by a common element (information in the case of cooperation; speed in the case of the bicycle) or else by steps (the five typical steps of a sales process considered as one: profiling the client, instilling trust, bringing about a decision process, favour action and close the sale). As such, high co-linearity is expected and multiple regression regressions are therefore risky (Lambin, 1990) while Cronbach's alpha can be used (while avoiding additive questions nevertheless). In fact, many authors comment that reflective variables (the statistical equivalent of functional variables) should only be treated with single linear regressions Diamantopoulos & Winklhofer (2001: 272): "[...] under reflective measurement, multi-collinearity is not an issue because only simple regressions are involved [...]".

Figure 3. Trust and its structural variables.



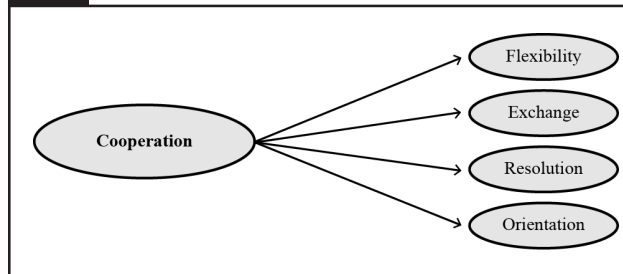
4. Bollen and Lennox (1991: 308) say: "Omitting an indicator is omitting a part of the construct".  
 5. Again, it has been noted that the Cronbach's alpha "[...] is a poor measure of a scale's reliability [...]" (Panagopoulos and Avlonitis, 2008: 370).  
 6. This applies to the method used here. Arrows would be in different direction in a structural equation modeling (SEM) software.



A structural variable (or construct) is represented in figure 4.

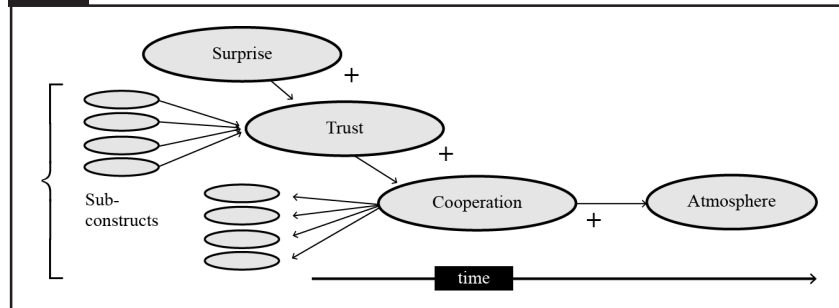
In the SDM case, there is not enough information to comment on all four structural variables that reflect cooperation; however, the exchange of information is put to test (“there was no discussion”).

**Figure 4.** Structural variables for the construct of cooperation.



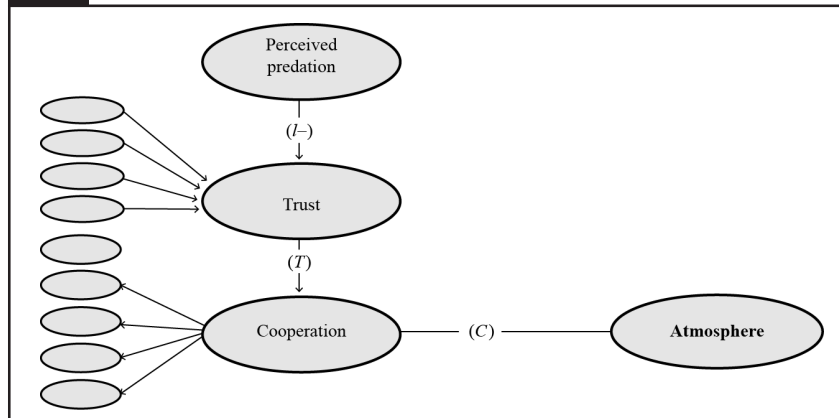
Note: All arrows depart from the relevant construct from one single point, indicating the absence of time factor. At least three functional variables are needed to give a good representation of the construct. Note also that there is no binary measurement with functional variable as they should be measured on a larger scale (e.g.: 5 or 7-point Likert scale). Their links (arrows) are identified by (F).

**Figure 5.** The SDM with structural and functional variables.



Note: Link (example) Surprise-Trust: Positive surprise, assume positive effect on trust. Negative surprise, hypothesize negative effect on trust, then negative effect on cooperation, then rupture of the relationship.

**Figure 6.** Types of arrows between different constructs using SDM example.



Note: The concept of surprise has been replaced by that of perceived predation, which negatively influences trust. Trust leads to cooperation, and cooperation causes a good atmosphere (or lack thereof causes rupture). A large perceived predation would reduce trust, which would eventually lead to reduced cooperation, and would cause the relationship to near its end. Each bubble would have at least three observables, that is, three non-additive questions in a quantitative questionnaire.

As can be guessed, observables are functional in their own rights: they express a construct and do not involve any time factor. If we were to assume a link between trust and cooperation as proposed in figure 2, we would have the following picture (see figure 5).

As can be seen from figure 5, a somewhat sound model is being built using the precepts presented in this paper. This should render the process of creating hypotheses much simpler and scientifically stronger. It also helps identifying what possible questions should be asked in the quantitative questionnaire.

As can be guessed, unless what one is doing is descriptive research, most models involve more than one construct (such is the case with the above SDM example); the next section deals with this matter.

### 6. More than one construct

As seen above, there are four kinds of links between variables (constructs). As it turns out, three definitely involve a time

factor, even if minimal: Influence (I), longitudinal (T) or Causal (C). Descriptive is not a time factor-loaded format. From this perspective, structural and functional variables are technically descriptive in nature. When time factor is involved (I, T and C variables), the rule of thumb is generally to “position the dependent variable on the right in the diagram and the independent variables on the left” (Creswell, 1994: 85). It is also possible to position variables on top of each other (especially when devising SEM-based models) as long as the type of link is clearly identified. This can be done when insinuating that events happen quasi-simultaneously. On the Influence (I) links, the following characteristics must be noted (positive + or negative -) and mediating/moderating or regular. Figure 6 shows some of these different possibilities, using SDM as an example once more.

In this figure, trust and cooperation would be latent (non-observed) variables; they would rather be the result of the structural or functional variables, and each would be measured with at least three observables. This would not prevent some direct measure of

trust and cooperation (with three observables each) as a double-checking measure. If we were to use this model, the minimal number of participants needed would be 12 constructs (bubbles) \* 3 observables each \* 9 participants<sup>7</sup>/ observable = 324. In reality, from the case submitted, there isn't enough information to capitalize on all four sub-constructs that form trust and four sub-constructs that reflect cooperation, so that fewer participants would actually be needed (see figure 7).

Based on this model, there are 6 constructs actually discussed in the case, with 18 observables needed, for a total of  $6 \times 3 \times 9 = 162$  participants required. The questionnaire would have at least 18 questions (plus socio-demographic information), each being appropriately phrased and related to the construct it was meant to measure. Questions could be, in the case of perceived predation for example:

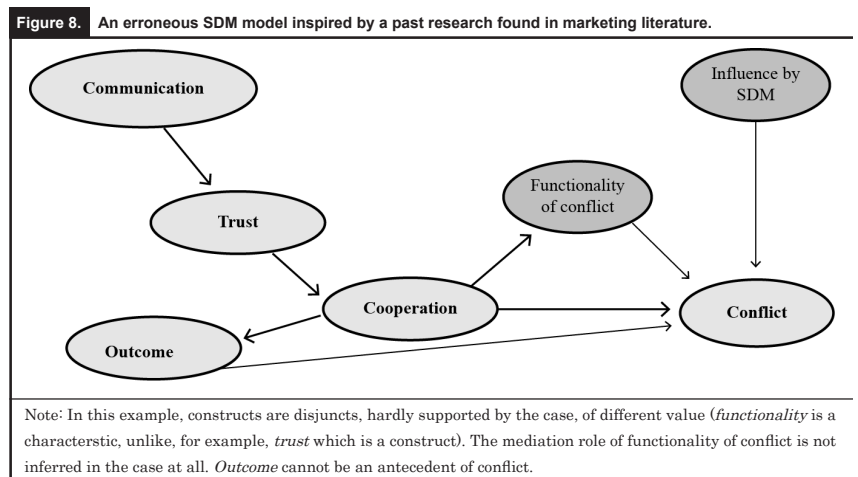
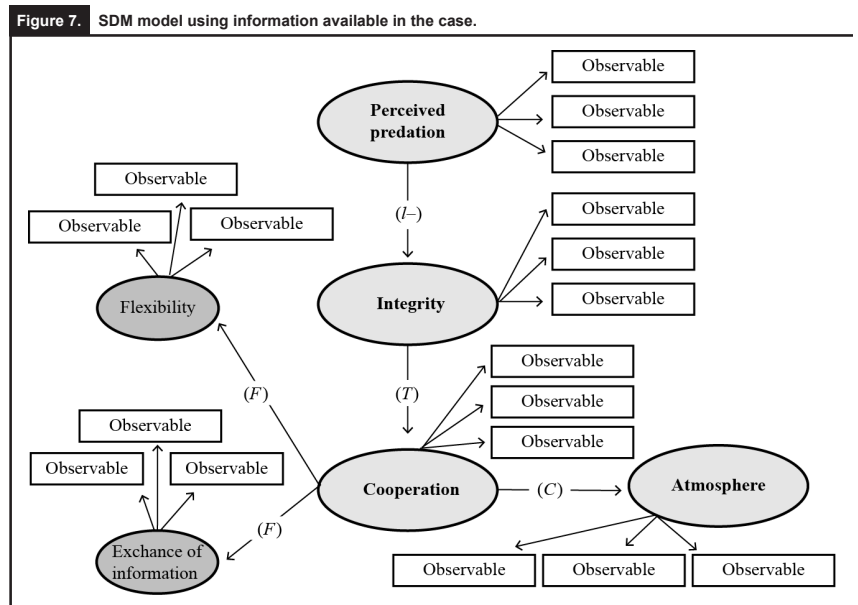
- a) Did SDM let you know in advance of its intention?
- b) Did you feel cornered by SDM's sudden decision?
- c) Does SDM's sudden decision represent a threat to the viability of your business with them?

As can be judged from figure 7, the use of proper modeling leaves no room for misinterpretation. At a glance, one can understand the events as they are happening and how many participants are required to run a minimal statistical test the likes of a multiple linear regressions. Despite the fact that arriving as such modeling was relatively easy even with minimal information provided by the SDM case, very few marketing articles propose models that are simple, self-explanatory, and consistent with the goal of the research, data collection and analysis. It is out of the range of this article to criticize models presented in many (sometimes highly-quoted) journals but the present author is open to reviewing models prepared by fellow colleagues in the marketing field.

An erroneous model based on the SDM model (inspired by a model found in past research)<sup>8</sup> would be as follows (see figure 8):

Questions that should not be asked with respect to figure 7 because of poor psychometric value (inspired by questions found in questionnaires published in marketing journals) would be (see table 1):

There is more to modeling. The science of marketing seems to be clustered in a very narrow range of constructs, methods and approaches. Yet, science evolves by opening its eyes, not by closing them. After all, marketing has borrowed heavily from sciences such as psychology and sociology. Nothing prevents it from borrowing from other sciences such as ethology. This opening of the research interest has been qualified data percolation (Mesly, 2012). The following section discussed some of its principal tenets.



7. For the reasoning behind this requirement, see Mesly, 2011.

8. The names of the authors are kept silent to avoid giving the impression of discrediting their work.

### 7. Data percolation methodology and multiple angles

Data percolation is a methodology which main objective is to look at reality through various lenses, much like an image can be rendered by a kaleidoscope. Multiplicity (exempt of complexity) of informants and sources, cases, and perspectives are encouraged to ensure no rocks are left unturned. Most regretfully, the large majority of marketing articles make a point of being clustered in the same paradigms and of avoiding looking at different fields under the pretext that this serves the interest of objectivity. We pretend it is actually exactly the opposite that is achieved, and that objectivity is better achieved by examining reality from different angles. In short, no one possesses absolute truth; comparison may be, in social sciences, the best way to guarantee some form of validity to the research.

As Wieseke *et al.* put it (2008: 324), “...obtaining data from multiple informants has been recommended as superior to such an approach”. Van Bruggen, Lilien & Kacker (2002: 470) presented the following arguments along those lines a few years before: *a)* the use of a single source of information could lead to systematic errors; *b)* a single expert cannot possibly be an expert in all domains; and *c)* errors occur due to mere chance (or lack thereof), hence the need to check with different viewpoints. Yet even earlier, Anderson (1983: 19) had convincingly stated that “science progresses through the accumulation of multiple confirming instances obtained under a wide variety of circumstances and conditions”.

In research, the colour white cannot be solely described by the elements that form it (all colours but white). It can also be

defined by what it is not –black and by its process.<sup>9</sup> The use of contrasts (Yin, 1997) is most useful in questionnaire preparation for example: the researcher can verify whether a question is understood by comparing its answer to the answer to the opposite question. According to Miles & Huberman (2003: 349) “table of contrasts” could actually help determine causality, or else provide atypical or contradictory explanations. Deviant cases (Patton, 1990: 169) are what allow the researcher to set the operational limits of his constructs. These limits are rarely discussed in marketing papers, and this represents a shortage of scientific rigour. For example, in the SDM case, it may well be that the suppliers’ reaction would have been vastly different if the surprise fee had been of 10% or 30%. It can be assumed that SDM –a multi-billion dollar company– did not set the 20% increase artificially but rather studied ahead of time the maximum limit its suppliers were ready to tolerate in order to maximize its own benefits (to the detriment of its suppliers of course).<sup>10</sup>

While most marketing research (perhaps as much as 98%) is geared towards what we would term pseudo-objectivism, the reality is that a more human approach (more in line with the profound nature of sales and marketing) may be what is needed. Humanism (Hirschman, 1986) welcomes multiples realities, accepts interactions with participants (most marketing research are conducted behind a desk, with the researcher never actually getting to see, talk, or meet at least some of the participants), is open to temporary statements and assumptions and does not long for causal relationships.

The use of multiple perspectives has another advantage: it improves on methodological expertise and produces technical

innovations. Boutin (2008: 46) makes the point that standardized, locked-in methods tend to prevent the researcher from finding alternatives solutions to problems and to miss on some key attitudes that do not necessarily stand out using conventional methods. Given that most marketing articles end by suggesting how managers in companies could use their theories, it would make considerable sense to broaden the scope of analysis so that their possible outcomes meet any managers’ objectives (e.g.: produce innovation to gain a competitive advantage). Yet, this is seldom done first because there is no habit in doing it; second, because many marketing researchers have actually never worked as managers in the field where cut-throat competition takes

**Table 1. Improper questions.**

Erroneous phrasing
1. You wished SDM had been more[...] Informative 5,4,3,2,1 Persuasive [...] (Two scales).
2. How interested would you be in seeing the person with whom you were doing business with at SDM? (Too complex).
3. Should both parties expect to be able to make adjustments in your ongoing relationship to cope with changing circumstances? (Difficult wording).
4. Is it expected that both parties keep each other informed about changes that may affect the other partner? (Expected by whom?).
5. Should problems that have occurred through the course of this relationship be treated by each party as joint rather than individual responsibilities? (Who wants to bear the responsibility?).
6. Did you feel it was important not to use proprietary information to the other party’s disadvantage in order to not create this new policy set by SDM (Multiple negatives).
7. A key characteristic of this relationship was that you did not expect SDM to make demands that might be damaging to the other (Very hard to measure).
8. The parties expect the more powerful party to overuse his power in attempting to.

9. Mixing colours from the different wavelenghts will procude white; mxing chemical colours out of tubes will procude black.

10. This is what is referred to as predation: taking advantage of someone’s weakness (the dependence of the suppliers) for one’s own benefit, causing him economic harm (a loss of 20% on their income), by surprise.

place; and third because this additional effort, while truly scientific, is not institutionally encouraged.

Of course, as mentioned by Wieseke *et al.* (2008: 330) “[...] it is essential that researchers consider what the most appropriate method of analysis for their data is, otherwise misleading results can occur”. But this can be taken the other way around: it is essential that the most appropriate method does not preclude the use of multiple perspectives so that no reality is missed, with erroneous conclusions or analyses taken place.

### Conclusion

In this paper, we strongly emphasized the need to add rigour in marketing scientific writings and we provided some tools in that direction.<sup>11</sup> We also strongly recommended that research be anchored in reality. As Patton (1990: 12) –among others (e.g.: D’Astous, 2010: 295)– said: “The purpose of applied research and evaluation is to inform action, enhance decision making, and apply knowledge to solve human and societal problem”.

Writings are for the public domain (Laurencelle, 2005) and no public shall be exempted in order to serve complexity for its own sake. Rather, the researcher must simplify his model and clearly demonstrate the nature of his constructs and of the links that bind them

In particular, we recommend that any research be anchored in a marketing trend,<sup>12</sup> relates or compares to existing concepts, models, methodologies and researches (this is fortunately commonly done). Data collected must be *a*) exhaustive<sup>13</sup> (near or at saturation), *b*) discriminatory (non-redundant<sup>14</sup> and pertinent),<sup>15</sup> and *c*) cohesive (parallelism<sup>16</sup> in the writing and the modeling).

While many authors long to create their own theories or else refer to some views expressed by previous authors as theories, one should be weary of such wording. Not everything is a theory, far from it.

A theory is made of constructs that are bound together in some logical way (Creswell, 1994; Neuman, 1994). To build models containing floating variables or to avoid identifying the kind of links between variables (constructs) may be a preliminary step, but certainly not a conclusive step in theory generation. To aim for complex models (as is so often the case in marketing articles) to the detriment of key scientific qualities (precision, adapted to experimental data, rich in value)<sup>17</sup> is not doing a full job and this should necessarily be specified in the limitations section of any article.


Another flaw that seems to characterize the end part of marketing articles concerns validity. Podsakoff and Dalton among others noted fifteen years ago (in 1987) that at least 15 % of research lack validation efforts (see Peter, 1979). There is some

evidence of confusion with respect to types of validity and to their real, concrete applications. Convergent validity should assist in identifying variables and chains of evidence, especially by using multi-disciplinarity. If many scientific evidences point to the fact of some “human predation” for example (psychology, criminality, ethology, sociology, etc.), then there is a very strong likelihood that human predation exists and that it could thus be used as a concept in marketing theory. For example, SDM actions fall well within the definition of marketing and of previous predatory marketing phenomena. Also, while most research is done using different models, it is perhaps justified to promote that similar researches be conducted if it were only to expand the nomological validity of these models. This, as generally known, is hardly ever done in marketing science while in other sciences (e.g.: biology), it is routine.

As for internal validity, we express the opinion that the system we presented allows to better define constructs, to understand the links that bind them, and to clarify potential observables. Statistical validity (e.g.: discriminant) can and should be used but within the understanding that some constructs are indeed closely linked (e.g.: trust and cooperation).

As for external validity, the search for contrasting cases can only help, as opposed to conducting research in narrow fields of investigation. Finally, reliability is increased when researches are conducted in a longitudinal manner, a type of research that is rather (alas!) rare in the marketing literature but common in, for example, the pharmaceutical industry.

Our view of the marketing literature –a view that adds to previous arguments made by other authors over the last 30 years, is that *a*) the overall orientation is too narrow and plagued by undesirables biases, *b*) contains many modeling errors that are rather easy to correct, and *c*) leads to incomplete or erroneous conclusions, in sharp contrast to other sciences which have used more rigorous approaches and methods.

We hope that the propositions made in this paper will help the marketing field and researchers, if not doctorate students, in facilitating the creation of models and questionnaires. 

11. More could be added, but for the sake of this article, we focused on the essential.
12. As an exemple Daune-Richard and Anne-Marie Devreux (1992: 7): “We pertain to the marxist line of thought [...]” (our translation).
13. Of else, this should be mentioned as a limit to the research.
14. So, one should avoid additive questions.
15. So, one should use proper scaling.
16. So concepts should be properly defined and questions in quantitative questionnaires should exhibit psychometric properties.
17. See Weil-Barais *et al.*, 1997.

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Annexe 1. Use of Baron and Kenny (1986)'s test.

Author	Year	Article	Publication	Subject of study	R2	Baron & Kenny (1986) for mediator	Aiken & West (1991) for moderator	Kenny, Kashy & Bolger (1998) for mediator
Grayson, K. & Ambler, T	1999	The Dark Side of Long-Term Relationships Marketing Services.	<i>Journal of Marketing Research</i>	Confiance, etc.	0,12-0,22	Baron & Kenny (1986)	s/o	s/o
Campbell, M.C. & Kirmani, A.	2000	Consumers' Use of Persuasion Knowledge: The Effects of Accessibility and Cognitive Capacity on Perceptions of an Influence Agent.	<i>Journal of Consumer Research</i>	Persuasion	na	Baron & Kenny (1986)	s/o	s/o
Nicholson, C.Y., Compeau, L.D., & Sethi, R.	2001	The role of interpersonal liking in building trust in long-term channel relationships.	<i>Academy of Marketing Science</i>	Affinités	0,54-0,71	Baron & Kenny (1986)	s/o	s/o
Lichtlé, M.-C.	2002	Étude expérimentale de l'impact de la couleur d'une annonce publicitaire sur l'attitude envers l'annonce.	<i>Recherche et Applications en Marketing</i>	Annonce, couleur	s/o	Baron & Kenny (1986)	s/o	s/o
Joshi, A.W. & Sharma, S.	2004	Customer knowledge development: antecedents and impact on new product performance.	<i>Journal of Marketing</i>	Client	0,20-0,47	Baron & Kenny (1986)	s/o	s/o
Atuahene-Guma, K.	2005	Resolving the capability-rigidity paradox in new product innovation	<i>Journal of Marketing</i>	Orientation	0,21-0,43	Baron & Kenny (1986)	Technique divisée	s/o
Bart, Y., Shankar, V. Sultan, F. & Urban, G. L.	2005	Are the drivers and role on online trust the same for all web sites and consumers ? A large-scale exploratory empirical study.	<i>Journal of Marketing</i>	Confiance en ligne	s/o	Baron & Kenny (1986)	s/o	s/o
Medina, F.J., Munduate, L., Dorado, M.A., Martínez, I. & Guerra, J.M.	2005	Types of intragroup conflict and affective reactions.	<i>Journal of Managerial Psychology</i>	Conflit, satisfaction	0,11-0,24	Baron & Kenny (1986)	s/o	s/o
Janakiraman, N., Meyer, R.J. & Morales, A.C.	2006	Spillover effects : how consumers respond to unexpected changes in price and quality.	<i>Journal of Consumer Research</i>	Prix et qualité	s/o	Baron & Kenny (1986)	s/o	s/o
Okada, E.M.	2006	Upgrades and New Purchases.	<i>Journal of Marketing</i>	Similarité de produits	0,24	Baron & Kenny (1986)	s/o	s/o
Zhang, Y., Feick, L. & Price, L.J.	2007	L'impact de la conception de soi sur les préférences esthétiques pour les formes anguleuses ou les formes rondes.	<i>Recherche et Applications en Marketing</i>	Conception de soi	0,23-0,31	Baron & Kenny (1986)	s/o	s/o
Su, C., Zhou, K.Z., Zhou, N. & Li, J.J.	2008	Harmonizing conflict in husband-wife purchase decision making: perceived fairness and spousal influence dynamics.	<i>Journal of the Academy of Marketing Science</i>	Équité, influence	s/o	Baron & Kenny (1986)	s/o	s/o