Rejoinder to:

An investigation of the structure of expectancy-value attitude and its implications *

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*Science has not the monopoly of truth
but only the monopoly of the means
for checking truth and enhancing it.*
Mario Bunge

Introduction

The purpose of my article (Yi, 1989) was to explore what might be the benefits of employing a structural representation of expectancy-value (EV) attitude, compared with the traditional representation (i.e., a summary value). In doing so, the implications of the structural representation were investigated. Specifically, the question addressed was: Does the structural representation of EV attitude provide any advantage for understanding (a) the relationship of EV attitude to A-act and BI, and (b) the dynamics of belief change?

Vanden Abeele (1989) made some critical comments about this article and questioned the validity of the results. He concluded that "many of the claims made in the paper are debatable; more importantly, such debate is the result of a more general disagreement with the strand of EV research exemplified by

this paper" (p. 85). His comments can be summarized as the following three key issues.

(1) The EV framework is a structural model, not a measurement model; joint testing of structure and measurement in a model should be avoided.

(2) The hypotheses and results in the paper are ambiguous.

(3) The generalizability of the results in the paper can be questioned.

These are important and interesting issues in the investigation of EV attitude. However, I have found that many of the comments are difficult to accept and stem from a misunderstanding of my claims. In this paper, I will examine the validity of these comments and clarify the confusion surrounding my original arguments. To facilitate the presentation, each of the three issues will be discussed in sequence.

1. EV, structural or measurement model?

An important issue is related to the functional form of EV attitude. Vanden Abeele claimed that the traditional EV model "resolves the problem of transforming the multiplicity of disparate beliefs into the unidimensionality of attitudes or intentions" (p. 85). However, the traditional EV model gives very little consideration to the structure of EV attitude. The model merely assumes a particular functional form of EV attitude by defining it as the sum of belief-times-evaluation products and examines only the predictive validity

of EV attitude. It seems useful to investigate other functional forms and the structure of EV attitude and the underlying processes in more depth (cf. Bagozzi, 1985, 1988). To restrict the EV model to one functional form is rather shortsighted and closes scientific inquiry.

Another key issue concerns the *implicit* assumption of the traditional EV model that beliefs are independent. According to Vanden Abeele, this assumption should be met before the EV model is applied. An important question then arises: What should one do if some beliefs are found to be correlated? Should one discard the data and stop the analysis? Maybe not. In many cases, one may wish to make the best use of the given data. Indeed, correlated beliefs may reflect real interdependencies in the minds of consumers. Rather than assuming these away, it would be better to test specific interdependencies as hypotheses. Many psychological theories in fact hypothesize specific interdependencies among beliefs.

One might try to satisfy the assumption of belief independence by extracting orthogonal beliefs (e.g., via factor analysis) from the beliefs elicited by consumers. However, the original set of salient beliefs was retained in my study for several reasons: (1) the orthogonalization of beliefs is seldom used in practice or suggested explicitly by EV researchers (e.g. Fishbein and Ajzen, 1975); (2) although one can extract some independent beliefs, it is unlikely that consumers will actually use these derived beliefs in product evaluations; (3) previous researchers have, on the basis of theory, used interrelated beliefs within the expectancy-value framework (e.g., Bagozzi, 1985; Oliver and Bearden, 1985; Shimp and Kavas, 1984); and (4) more importantly, the purpose of my study was to examine the benefits of explicitly modeling the interrelations among beliefs.

Clearly, Vanden Abeele and myself disagree fundamentally in dealing with the violation of the independence assumption. Vanden Abeele regards the attribute redundancy as an anomaly to the EV model that should be avoided before analysis. However, I treat the attribute redundancy as useful data that should be included in the analysis. In other words, the EV model is extended by incorporating attribute redundancy (rather than removing attribute correlations artificially) and modeling the processes underlying the redundancy. I believe that the latter approach is more fruitful because it can provide useful insights into attitude formation and change processes.

One might argue that labels other than 'EV models' should be used for the nontraditional models that employ the beliefs violating the independence assumption of the EV model (in a narrow sense). However, the term 'EV model' was used in a broad sense for several reasons: (1) 'EV models' (e.g., modified EV model, multi-dimensional EV model) have been used to refer to nontraditional representations in previous research (e.g., Bagozzi, 1985; Burnkrant and Page, 1988; Shimp and Kavas, 1984); (2) because different modifiers were used for alternative models (e.g., traditional EV model, interdependence EV model), the distinctions between the models were maintained; (3) although the models differed in the representation of EV attitude, they all used beliefs and evaluations, basic elements of the EV framework; (4) the models were related to each other in a way that one model was a special case of another (for example, the multi-dimensional EV model is a special case of the interdependence EV model); (5) the proposed EV model was positioned as an *extension* of the traditional EV model by relaxing the independence assumption that has often been found questionable in previous research; and (6) the differences between the models with respect to this assumption were fully explained in the article to eliminate any confusion.

Vanden Abeele also criticized the applica-

tion of covariance structure analysis by claiming that it had several adverse consequences on the development of EV theory. Let us now examine these so-called adverse consequences of using structural equation modeling.

1.1. Neglect *of the links from E V attitude to A-act and BI*

Vanden Abeele made the criticism that: "In some studies (and, for example, in this paper), the link to attitudes/intentions is *not* explicitly incorporated" (p. 86) (emphasis added). However, the links from EV to attitudes and intentions were explicitly examined in the study. Specifically, the direct path from EV to A-act, the direct path from EV to BI, and the indirect path from EV to BI (via A-act) were estimated and examined under alternative EV models (Yi, 1989, Hypothesis 2 and Table 2). In fact, the links from EV attitude to A-act and BI have been investigated in most studies that employed covariance structure analysis (e.g., Bagozzi, 1985; Burnkrant and Page, 1988; Oliver and Bearden, 1985; Shimp and Kavas, 1984). Thus, this criticism is unfounded.

1.2. Joint estimation *of measurement and theory*

The joint estimation of measurement and theory was criticized as follows: "While an interaction between method and theory is desirable, I believe that their complete and simultaneous interdependence in tests of EV theory is counterproductive" (p. 86). Several problems exist with this point of view. First, it is difficult to understand why interdependence of measurement and theory is desirable in general, but counterproductive in the context of EV theory. No specific reasons were given for this argument. Second, this criticism is quite contradictory to his earlier statement: "EV theory thus offers a structural model which relates expectancies and values to atti-

tudes and intentions; any test of EV theory should contain a test of this link" (Vanden Abeele, 1989, see point (l), p. 85). Third, an interaction of measurement and theory does not occur for all covariance structure analyses. For example, Hypothesis 1 concerned the validity of the measurement model for EV attitude, and thus no joint estimation was involved in the test of it. Finally, and more importantly, it has been found that the measurement or Operationalization of a construct is important in testing the theory. For example, Shimp and Kavas (1984) have shown that representing a multi-dimensional cognitive structure improperly as uni-dimensional can lead to erroneous conclusions concerning the relationship of cognitive structure with subjective norm. Bagozzi, Baumgartner and Yi (1989) have also shown that discovery of the role of intentions depends on the measurement of intentions.

1.3. Logic underlying the measurement model

The traditional model represents EV attitude simply as a single value formed as the sum of expectancy-times-value products. This measurement model suggests that EV attitude is formed through some process of aggregation. That is, expectancy-value judgements are seen as formative indicators for EV attitude in the traditional model. This structure has invariably been taken for granted but rarely tested.

My study follows a recent stream of research (Bagozzi, 1985 ; Oliver and Bearden, 1985; Shimp and Kavas, 1984) by challenging the assumption that expectancy-value elements necessarily aggregate into a single unit, $\sum B_i a_i$. Vanden Abeele takes the single unit as a given or untested assumption. I treat the formation of an EV attitude as a hypothesis to be tested. In this research, product attributes are allowed to vary in their level of abstraction; product attributes are viewed as lying on a continuum from the concrete to the abstract, forming a hierarchy. For example,

4. Conclusion

The EV framework has been a useful research paradigm in marketing research for several decades. However, as Vanden Abeele (1989, p. 87) put eloquently, "Landmark studies are followed up progressively more detailed research which *fine-tunes* the original paradigm" (emphasis added). Indeed, my research represents an effort to fine-tune and extend the EV theory by looking deeply into the structural form of EV attitude. EV attitude is traditionally defined as the sum of belief-times-evaluation products and represented as a summary value. This representation of EV attitude has been taken for granted by many researchers. In contrast, my research explores the possibility for alternative representations of EV attitude.

It is my contention that the structure of EV attitude should be tested as a hypothesis, rather than merely assumed as a matter of truth. In fact, several researchers (Bagozzi, 1985, 1988; Burnkrant and Page, 1988) have recently challenged the assumption that EV attitude exists as a uni-dimensional construct, and instead suggested a multi-dimensional structure of EV attitude. My study extends this line of research further by investigating what useful insights such a structural representation of EV attitude can provide for consumer information processing and persuasion processes. The findings suggest that research on the structure of EV attitude can be fruitfully linked with research on its effects on intentions and behavior. Given these findings, I believe that the measurement or cognitive structure model and the EV or structural model should be investigated simultaneously, rather than kept separate. My study represents an attempt to refine the EV framework, but surely much remains to be done. It is hoped that more vigorous and extensive research on EV attitude will be conducted in an open-minded way so that the EV framework can evolve to become a more powerful tool for researchers.

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