

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

Youjae YI **

*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

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** Youjae Yi is an Assistant Professor of Marketing at the School of Business Administration, The University of Michigan, Ann Arbor, MI 48109-1234, U.S.A. The author wishes to thank Professor Piet Vanden Abeele, Richard Bagozzi, and Gilles Laurent regarding this stimulating intellectual communication.

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 vio-

lation 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 EV 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 (1), 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,

several subordinate attributes are expected to reflect a superordinate attribute. This measurement model implies an underlying process of abstraction.

Vanden Abeele claimed that the measurement model applied in my study does not follow the logic of the standard EV framework. However, no specific reasons were given as to why one should use the former type of measurement model for EV attitude. My contention is that one should consider alternative models and that the models should be tested against data, rather than merely assumed. In my study, two alternative measurement models were tested for the structure of EV attitude. The measurement model with formative indicators gave an unsatisfactory fit (Yi, 1989, Footnote 5, p. 78). In contrast, the measurement model with reflective indicators was found to be satisfactory. This finding provides support for the measurement model used in my research.

1.4. Valued expectancy

Vanden Abeele questioned whether the evaluated belief or valued expectancy has psychological meaning as a separate construct. The use of valued expectancy was based on the assumption that beliefs and evaluations combine to form attitude in an interactive (rather than additive) way. There is a considerable body of support for this operationalization (e.g., Oliver and Bearden, 1985; Shimp and Kavas, 1984), which will not be described here. For a nice discussion of the psychological mechanisms underlying the multiplicative relationships between beliefs and evaluations, see Bagozzi (1985, pp. 45-47).

2. Ambiguity of hypotheses and test results

2.1. Hypothesis 1 and test

The interdependence EV model was criticized on the ground that its superiority is

likely to be contingent upon the data. However, it was not claimed that EV attitude has always an interdependent structure. For some acts, especially with a small number of consequences or relatively independent consequences, simpler representations such as the traditional EV model might constitute enough means for representing EV attitude. Future research should examine the conditions under which the interdependent structure might or might not occur for EV attitude. These points were all discussed explicitly in my paper (Yi, 1989).

2.2. Hypothesis 2 and test

Hypothesis 2 about the direct path from EV attitude to BI was based on previous research. Existing findings to date are mixed as to the effect of EV attitude on BI. Traditional EV researchers have viewed and found that EV attitude influences BI only indirectly through A-act (Fishbein and Ajzen, 1975). In contrast, other researchers have claimed and found that EV attitude can have direct effects on BI (Bagozzi, 1982; Liska, 1984). The present study attempts to explain these conflicting findings by examining the representations of EV attitude employed by these researchers. The former group of researchers typically used the traditional point representation of EV attitude, whereas the latter tended to adopt structural representations. Thus, I proposed and tested Hypothesis 2 that representations of EV attitude would affect the observed direct effects of EV attitude on BI. Obviously, an alternative hypothesis is that the direct path from EV attitude to BI does not vary with representations of EV attitude.

A rationale for the direct path from EV attitude to BI would be that human information processing is not perfect, and thus not all cognitions in EV attitude can be processed into A-act, a uni-dimensional affect (Liska, 1984; Schlegel and DiTecco, 1982). Because the uncaptured cognitions are still likely to

influence BI, direct effects of EV attitude on BI may exist. The above argument suggests another hypothesis that the direct path may depend upon the complexity of cognitions and the information processing capacity. This hypothesis can be tested in future research. For example, information processing capacity may depend on such variables as need for cognition, expertise, or knowledge. People with high need for cognition or expertise might be able to efficiently process EV judgements into A-act, and most effects of EV attitude on BI would be mediated through A-act. In such a case, a direct path from EV attitude to BI is less likely to be observed. Such a stream of research will not only extend Hypothesis 2 by clarifying the mixed findings in the current literature but also contribute toward a better understanding of the attitude-behavior relation.

2.3. Hypothesis 3 and test

Vanden Abeele criticized the test of Hypothesis 3 because it is impossible to establish a causal link on the basis of cross-sectional data. The difficulty of demonstrating the causality is well known among researchers, which does not need elaboration here. However, so far as the beliefs are interdependent in an either causal or correlational sense, the prediction of Hypothesis 3 remains the same: the change in one belief will induce changes in other beliefs that are interdependent with the belief. Thus, the test of Hypothesis 3 is not affected by the causal order.

2.4. EV theory and test

Vanden Abeele maintained that my study is not a test of EV theory. Indeed, the study was neither intended nor claimed to be only a test of the traditional EV model itself. The traditional and nontraditional representations were treated as alternative operationalizations of EV attitude in the study. Specifically, Hy-

pothesis 1 compared the convergent validity of several nontraditional EV models. Hypotheses 2 and 3 explored what might be the gains of employing a structural representation of EV attitude, instead of using a point representation. In doing so, Hypotheses 2 and 3 examined the implications of EV attitude structure for predicting intentions and for understanding advertising effects on unmentioned beliefs, respectively.

3. Generalizability of results

Vanden Abeele argued that demand artifacts might have caused the findings of the study, limiting their generalizability. However, several precautions were taken in the study to eliminate the demand artifacts among subjects: (1) the purpose of the study was disguised with a plausible cover story; (2) filler items were inserted throughout the questionnaires which fit with the cover story; (3) it was emphasized that all questions concerned the subjects' own thoughts and feeling with no right or wrong answers; and (4) subjects were not allowed to go back to the earlier responses by collecting the data from separate books. Post-experimental inquiry did indeed reveal no indication of demand artifacts; no one mentioned the effects of one belief change on interdependent beliefs as the purpose of the study. Of course, one can still argue that this is not a perfect check. However, even if any unmeasured demand artifacts had existed, it is not clear why demand effects would have induced changes only for interdependent beliefs.

Another claim was that the hypotheses are quite specific to the data and application studied. The results such as the nature of interdependent beliefs are probably behavior-specific. Nevertheless, the hypotheses are formulated in a general way so that the processes and the patterns of results are in fact applicable to many other contexts.

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 by 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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