

A Comparison of Conjoint Measurement with Self-Explicated Approaches

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Abstract

The most popular methods for measuring customers' preference structures are conjoint measurement and self-explicated approaches. Despite the fact that conjoint measurement has several theoretical advantages over self-explicated approaches, empirical studies comparing these two methods have produced mixed results. In this article we give a synopsis of theoretical considerations on conjoint measurement and self-explicated approaches as well as a comprehensive overview of empirical findings comparing these two methods.

1. Introduction

Over the past two decades conjoint measurement has been a popular method for measuring customers' preference structures. Wittink and Cattin (1989) estimate that about 400 commercial applications were carried out per year during the early 1980s. In the 1990s this number probably exceeds 1000. The popularity of conjoint measurement appears to derive, at least in part, from its presumed superiority in validity over simpler, less expensive techniques such as self-explication approaches (Leigh, MacKay and Summers 1984). However, when considered in empirical studies, this superiority frequently has not been found (e.g. Green and Srinivasan 1990; Srinivasan and Park 1997). This issue is of major practical relevance. If, at least in certain situations, conjoint measurement is not clearly superior in validity to self-explicated approaches, it becomes highly questionable whether future applications for measuring customers' preferences should be done by conjoint measurement, as self-explicated approaches are clear advantageous in terms of time and money effort.

When comparing the validity of conjoint measurement with self-explicated approaches, one has to distinguish between different types of conjoint measurement methods which can lead to varying results in terms of validity. Most of the traditional conjoint approaches use full profile descriptions and ordinary least squares (OLS) regression to estimate partworths (Green and Srinivasan 1978; Wittink and Cattin 1989). Other types of conjoint measurement like Green's hybrid conjoint analysis (Green, Goldberg and Montemayor 1981), adaptive conjoint analysis (ACA; Johnson 1987) and customized conjoint analysis (CCA; Srinivasan and Park 1997; Hensel-Börner and Sattler 1999) combine the self-explicated task with aspects of the full

profile conjoint analysis. We call all of these types "hybrid conjoint measurement". Because most of the research during the last 15 years has been focused on these hybrid conjoint methods (Green and Srinivasan 1990; Srinivasan and Park 1997), we shall include them in our analysis.

Similarly to conjoint measurement, there are different types of self-explicated approaches. However, because very simple types of self-explicated approaches like desirability ratings only have obvious limitations (Nitzsch and Weber 1993), we shall include in our analysis just one type of self-explicated approach which has been applied in a number of studies (Green and Srinivasan 1990). Basically, this approach works in the following way (with some minor modifications between different applications, e.g. Srinivasan 1988). First, respondents evaluate the levels of each attribute on a (say) 0-10 desirability scale (with other attributes held constant) where the most preferred level on the attribute may be assigned the value 10 and the least preferred level assigned the value 0. Respondents then are asked to allocate (say) 100 points across the attributes so as to reflect their relative importance. Partworths are obtained by multiplying the importance weights with the attribute-level desirability ratings. (Green and Srinivasan 1990).

The aim of this article is to give a comprehensive overview of studies comparing the self-explicated approach and conjoint measurement. In the following section, we shall first consider the "theoretical" perspective by comparing several advantages as well as disadvantages of conjoint measurement and self-explication approaches respectively. After this, we shall give a broad overview of empirical studies comparing the two approaches under consideration in terms of reliability as well as predictive validity. Reliability and predictive validity are taken because almost all past empirical studies used at least one of these measures. Finally, conclusions are drawn from our findings.

2. Theoretical Considerations

The motivation for the development of (traditional) conjoint measurement stems basically from several theoretical advantages over traditional methods of measuring customer's preference structure, especially over self-explicated approaches (Green and Srinivasan 1990). Advantages

over self-explicated approaches are summarized in the upper part of Table 1 and will be discussed in more detail now. Our comparison focuses on purely decompositional methods of conjoint measurement (e.g. ranking or rating a set of stimuli), i.e. traditional conjoint measurement. Hybrid methods are not included because they combine advantages as well as disadvantages of decompositional (traditional conjoint) and compositional (self-explicated approaches) methods.

Table 1: Advantages of conjoint measurement and self-explicated approaches

Advantages of traditional conjoint measurement over self-explicated approaches

1. Greater similarity to real choice situations
2. Greater chance of detecting real importance weights
3. Less chance of receiving only socially accepted responses
4. Greater range sensitivity
5. Better chance of detecting potential nonlinearity in the partworth function
6. Less likelihood of double-counting

Advantages of self-explicated approaches over traditional conjoint measurement

1. Less cognitive strain on the data-supplying capabilities of respondents
2. Less chance of simplifying-effects
3. Greater ease in data collection (e.g. telephone sampling)
4. Greater ease in data analysis and research design
5. Greater ability to handle a large number of attributes
6. Greater speed in data collection
7. Lower costs in data collection and data analysis

First, in contrast to self-explicated approaches (i.e. compositional approaches), conjoint measurement does not directly ask for partworths of attribute levels. Instead, conjoint methodology is based on a decompositional approach in which respondents react to a set of total profile descriptions. Profile descriptions are a (more or less) realistic representation of a real product and therefore the task for the respondents (e.g. ranking of profiles) resembles a real choice situation to a greater extent than the self-explicated approach (Green, Goldberg and Montemayor 1981). This similarity to real choice situations is a key distinction from self-

explication approaches and may result in higher predictive validity, e.g. when predicting real product choices.

Second, the decompositional approach to identifying attribute partworths or importance weights is more likely to detect real importance weights than self-explicated approaches. When asking directly a question like "How important is attribute X?", it is not clear what the importance rating is supposed to mean, and different respondents are likely to interpret the question differently (Srinivasan 1988).

A third advantage of the decompositional conjoint measurement method over self-explicated approaches is that partworths and/or importance weights of attributes are obtained in an indirect manner. It is the job of the analyst to find a set of partworths for the attributes that, given some type of composition rule (e.g. an additive one), are most consistent with the respondent's overall preferences. For this indirect approach, only socially acceptable responses are less likely to occur than for self-explicated approaches (Hensel-Börner and Sattler 1999). For example, when respondents are asked directly for the importance of price, they might tend to underreport the importance because they possibly want to show that money does not matter much (even if it is a very important issue for them). This tendency might be weaker if respondents are asked indirectly.

Fourth, several empirical studies have shown that conjoint measurement is significantly more sensitive with respect to different ranges of attribute levels compared to self-explicated approaches, i.e. range sensitivity effects are less of a problem for conjoint measurement than for self-explicated approaches (Gedenk, Hensel-Börner, Sattler 1999). Sometimes, self-explicated approaches have been found to be *totally* insensitive to changes in attribute level ranges, which results in considerable validity problems (Nitzsch and Weber 1993).

Fifth, compared to self-explicated approaches, conjoint measurement has a better chance of detecting potential nonlinearity in the partworth function for quantitative attributes. For instance, suppose the capacity of refrigerators is varied at three levels, say 100, 125 and 150 liter. Given a 0-10 desirability scale with 0 for 100 liter and 10 for 150 liters, respondents may rate 5 for the intermediate level, making the partworth function linear. A full profile task has a

better chance of detecting potential nonlinearity in the partworth function. (Green and Srinivasan 1990)

Sixth, a problem with the self-explication approach is that any redundancy in the attributes can lead to double counting. For example, if energy costs and economy are two attributes of a refrigerator, there is an obvious risk of double counting because each attribute is questioned separately in the self-explicated approach. However, in a conjoint full profile approach respondents could recognize the redundancy between the attributes so that overall preference ratings would not be affected as much by double counting. (Green and Srinivasan 1990)

On the other hand, there are also several advantages of self-explicated approaches over traditional conjoint measurement (lower part of Table 1). First, for self-explicated approaches there is less cognitive strain on the data-supplying capabilities of respondents, because the approach is substantially easier to handle and task complexity is much lower (Akaah and Korgaonkar 1983).

Second, there is a lower chance of simplifying-effects (Wright 1975). Especially when a larger number of attributes is used in a full profile conjoint analysis, respondents tend to focus on just a subset of attributes while neglecting the other ones. If subjects behave in this manner, severe biases in estimating partworths can occur for the conjoint analysis approach.

Third, data collection can be done much more easily for self-explicated approaches than for conjoint measurement (Srinivasan 1988). This is particularly relevant for postal and telephone surveys where complex descriptions of total profiles of conjoint measurement are hard to undertake (Srinivasan and Wyner 1989).

Fourth, there is a higher ease in analyzing the data for self-explicated approaches. Despite the fact that easy to handle software for data analysis of conjoint measurement is available, at least basic statistical knowledge is highly recommendable in conducting a conjoint analysis. In contrast, neither specialized software nor advanced statistical knowledge is necessary in analyzing the data of self-explicated approaches. The same is true for setting up an experimental design. While just basic ability is necessary for self-explicated approaches, the

construction of an experimental design for conjoint measurement – e.g. in terms of stimuli construction – is rather complex.

Fifth, particularly due to advantage 1 and 2, there is a greater ability to handle a large number of attributes for self-explicated approaches compared to traditional conjoint methods (Srinivasan and Park 1997).

Sixth, also due to advantage 1, data collection can be done much faster than for conjoint measurement, especially for tasks with a large number of attributes. For this reason as well as due to advantages 3 and 4, finally, there are lower costs in data collection and data analysis for self-explicated approaches than for conjoint measurement (Green and Srinivasan 1990).

All factors taken into account, our discussion so far can be summarized as follows. Most of the reasons discussed favor conjoint measurement especially in terms of (predictive) validity, at least as long as there is a small number of attributes (six or fewer, Green and Srinivasan 1978). If, however, many attributes have to be handled, advantages 1 and 2 of self-explicated approaches (Table 1) may become crucial. Even for a small number of attributes, self-explicated approaches have considerable advantages over conjoint measurement in terms of ease of data collection, data analysis and research design as well as with respect to savings of time and costs in data collection and data analysis.

Despite the theoretical advantages of conjoint measurement in terms of (predictive) validity (for a small number of attributes), empirical research to date has produced rather mixed results. In case the advantages over self-explicated approaches can not be shown empirically, future applications of conjoint measurement seem to be at least questionable because of the advantages of self-explicated approaches in terms of ease, speed and costs. In the next section, a comprehensive overview of empirical studies which compare conjoint measurement with self-explicated approaches is given in order to determine this issue.

3. Empirical Comparisons

Our survey covers empirical studies comparing several types of conjoint measurement (including hybrid models) with self-explicated approaches in terms of reliability or predictive validity. In order to give a comprehensive overview, we selected all studies of this kind which have appeared in the International Journal of Research in Marketing, Journal of Marketing, Journal of Marketing Research, Marketing Letters, and Marketing Science since 1980. In addition to this, we have included available articles of the described kind which were frequently cited in these journals as well as recent available working papers.

The results of our survey are summarized in Table 2. The studies are ordered in terms of the types of methods compared, the measures investigated (i.e. reliability or predictive validity), and the results found. Unless otherwise indicated, all results are significant at the $p < 0.10$ level. Table 2 also shows the type of product investigated, the number of attributes, the sample size and the experimental design (i.e. "within" vs. "between subject design") for each study.

Out of the 23 results reported in Table 2, only 5 (22%, highlighted in Table 2) show significantly better results in terms of reliability or predictive validity for conjoint measurement compared to self-explicated approaches. The other 18 results (78%) show either non significant differences or significantly better results for self-explicated approaches. Given the theoretical advantages of conjoint measurement discussed in the previous section, these findings are surprising.

Looking exclusively at reliability, no study shows superior results for conjoint measurement. Instead, two out of four studies dealing with reliability found significantly better outcomes for self-explicated approaches. This result might be explained by the lower cognitive strain on the data-supplying capabilities of respondents for the self-explicated approach.

Table 2: Empirical studies comparing conjoint measurement with self-explicated approaches

Source	Methods Compared	Measure	Results a)	Products	Number of Attributes	Sample Size	Experimental Design
Srinivasan 1988	Conjoint trade-off – Self-explicated	Predictive validity (actual choices)	Non significant differences	Job offers	8	54	Within subject design
Leigh, MacKay and Summers 1984	Traditional conjoint – Self-explicated	Reliability	Non significant differences	Pocket calculators	5	122 e)	Between subject design
Heeler, Okechuku and Reid 1979	Traditional conjoint – Self-explicated	Reliability	Self-explicated better than conjoint b)	Electric blenders	10	98 e)	Between subject design
Green, Krieger and Agarwal 1993	Traditional conjoint – Self-explicated	Reliability	Self-explicated better than conjoint	Cars	8	133 e)	Within subject design
Green, Carmone and Wind 1972	Traditional conjoint – Self-explicated	Predictive validity (hypothetical choices)	No major differences b)	Discount cards	3	43	Within subject design
Leigh, MacKay and Summers 1984	Traditional conjoint – Self-explicated	Predictive validity (actual raffle choices)	Non significant differences	Pocket calculators	5	122 e)	Between subject design
Green and Helsen 1989	Traditional conjoint – Self-explicated	Predictive validity (hypothetical choices)	Non significant differences	Apartments	6	99 e)	Within subject design
Huber et al. 1993	Traditional conjoint – Self-explicated	Predictive validity (hypothetical choices)	Non significant differences	Refrigerators	5 and 9	393	Within subject design
Green, Krieger and Agarwal 1993	Traditional conjoint – Self-explicated	Predictive validity (hypothetical choices)	Mixed results for different measures	Cars	8	133 e)	Within subject design
Huber, Daneshgar and Ford 1971	Traditional conjoint – Self-explicated	Predictive validity (actual choices)	Self-explicated better than conjoint c)	Job offers	5	30 e)	Within subject design
Wright and Kriewall 1980	Traditional conjoint – Self-explicated	Predictive validity (actual choices)	Self-explicated better than conjoint	College applications	5	120	Within subject design
Green, Goldberg and Wiley 1982	Traditional conjoint – Self-explicated	Predictive validity (hypothetical choices)	Conjoint better than Self-explicated	Household appliance	7	476	Within subject design
Akaah and Korgaonkar 1983	Traditional conjoint – Self-explicated	Predictive validity (hypothetical choices)	Conjoint better than Self-explicated	HMO	6	80	Within subject design
Akaah and Korgaonkar 1983	Huber hybrid – Self-explicated	Predictive validity (hypothetical choices)	Non significant differences	HMO	6	80	Within subject design
Akaah and Korgaonkar 1983	Green hybrid – Self-explicated	Predictive validity (hypothetical choices)	Non significant differences	HMO	6	80	Within subject design
Green, Goldberg and Wiley 1982	Green hybrid – Self-explicated	Predictive validity (hypothetical choices)	Green hybrid better than Self-explicated	Household appliance	7	476	Within subject design

Table 2: Empirical studies comparing conjoint measurement with self-explicated approaches (continued)

Green, Krieger and Agarwal 1993	ACA – Self-explicated	Reliability	Non significant differences	Cars	8	133 e)	Within subject design
Green, Krieger and Agarwal 1993	ACA – Self-explicated	Predictive validity (hypothetical choices)	Mixed results for different measures	Cars	8	133 e)	Within subject design
Agarwal and Green 1991	ACA – Self-explicated	Predictive validity (hypothetical choices)	Self-explicated better than ACA d)	Apartments	6	170 e)	Within subject design
Huber et al. 1993	ACA – Self-explicated	Predictive validity (hypothetical choices)	ACA better than Self-explicated	Refrigerators	5 and 9	393	Within subject design
Hensel-Börner and Sattler 1999	ACA – Self-explicated	Predictive validity (market shares)	Non significant differences	Coffee	8	144	Within and between subject design
Srinivasan and Park 1997	Customized conjoint – Self-explicated	Predictive validity (actual choices)	Non significant differences	Job offers	8	121 e)	Within subject design
Hensel-Börner and Sattler 1999	Computerized customized conjoint – Self-explicated	Predictive validity (market shares)	Computerized customized conjoint partly better than Self-explicated	Coffee	8	144	Within and between subject design

- a) Significant differences between methods
- b) Significance not tested
- c) For experienced respondents; non significant differences for non experienced respondents
- d) Exception: ACA better than the Self-explicated part of ACA (Green, Krieger and Agarwal 1991)
- e) Respondents were students

In terms of predictive validity, comparisons between *traditional* conjoint measurement and self-explicated approaches show in two cases significantly superior results for self-explicated approaches and in another two cases significantly superior results for traditional conjoint measurement, while the remaining 5 studies found no significant differences or mixed results. Comparing *hybrid* conjoint methods (Huber hybrid, Green hybrid, ACA, and customized conjoint analysis) with self-explicated approaches there are no apparent advantages of hybrid conjoint approaches.

These results can be explained only partly by the type of measure, experimental design, sample size, sampling procedure, product category and the number of attributes (see Table 2). Interestingly, findings in favor of conjoint measurement can be observed for hypothetical choices (usually holdout stimuli) only, but not for actual choices. Moreover, all studies observing superior results for conjoint measurement used a within subject design. This kind of design— as opposed to between subject designs – may cause problems because of learning effects (Campbell and Stanley 1966; Huber, Wittink, Fiedler and Miller 1993; Agarwal and Green 1991). Compared with studies which found non significant differences or results in favor of self-explicated approaches, self-explicated approaches used at least partly between subject designs or actual choices as a measure of predictive validity, thus putting more emphasis on the findings of these studies, i.e. results in favor of self-explicated approaches seem to be more trustworthy with respect to these two issues. On the other hand, studies in favor of conjoint measurement used on average a larger sample size and non-students as respondents in all cases. With respect to the product category and the number of attributes, no systematic differences between studies in favor and against conjoint measurement can be found. For instance, the same kind of product and (approximately) the same number of attributes were used by the studies of Heeler, Okechuku and Reid 1979 and Green, Goldberg and Wiley 1982, but with opposite results.

4. Conclusions

Comparing conjoint measurement with self-explicated approaches from a theoretical perspective, conjoint measurement possesses obvious advantages in terms of (predictive) validity. However, our comprehensive analysis of empirical studies comparing these two

approaches fails to confirm the superiority of conjoint measurement. Instead, the majority of empirical comparisons (18 out of 23, i.e. 78%) found either non significant differences between methods or even higher predictive validity or reliability for self-explicated approaches. Attempts to explain these results by factors such as the type of measure, experimental design, sample size, sampling procedure, product category and the number of attributes are not promising because of mixed results.

Given the clear majority of empirical findings not in favor of conjoint measurement, future applications of conjoint measurement for measuring customers' preference structure seem to be at least questionable because of the advantages of self-explicated approaches in terms of ease, time effort and costs.

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